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Dept # 366

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved
OMB No. 44-R1267
#11

MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing,
Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME W.A. WOOD COMPANY		EMERGENCY TELEPHONE NO. 617-389- 2410
ADDRESS (Number, Street, City, State, and ZIP Code) 108 SPRING STREET EVERETT, MASS. 02149		
CHEMICAL NAME AND SYNONYMS		TRADE NAME AND SYNONYMS C EBLIS CUTTING OIL
CHEMICAL FAMILY Petroleum Hydrocarbons	FORMULA Mineral Oil, Sulfur Containing Hydrocarbons	

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS		N.A.	BASE METAL		N.A.
CATALYST		N.A.	ALLOYS		N.A.
VEHICLE		N.A.	METALLIC COATINGS		N.A.
SOLVENTS		N.A.	FILLER METAL PLUS COATING OR CORE FLUX		N.A.
ADDITIVES		N.A.	OTHERS		
OTHERS					
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV (Units)
NON E					

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	Greater Than 600°F	SPECIFIC GRAVITY (H ₂ O=1)	0.92
VAPOR PRESSURE (mm Hg.)	Unknown	PERCENT VOLATILE BY VOLUME (%)	
VAPOR DENSITY (AIR=1)	"	EVAPORATION RATE (_____ =1)	
SOLUBILITY IN WATER	Insoluble		
APPEARANCE AND ODOR Dark Colored oil with sulfurized odor			

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	400°F C.O.C.	FLAMMABLE LIMITS	Let	Uel
EXTINGUISHING MEDIA	Dry Chemical CO₂ FOAM			
SPECIAL FIRE FIGHTING PROCEDURES As with Mineral Oils				
UNUSUAL FIRE AND EXPLOSION HAZARDS May form some SO₂				

TRW-00345

SECTION V - HEALTH HAZARD DATATHRESHOLD LIMIT VALUE **UNKNOWN**EFFECTS OF OVEREXPOSURE **NONE KNOWN****EMERGENCY AND FIRST AID PROCEDURES**

skin contact, wash with soap and water. Eye contact--flush with water if irritated consult a physician.

SECTION VI - REACTIVITY DATA

STABILITY

UNSTABLE

STABLE

X

CONDITIONS TO AVOID

INCOMPATIBILITY (Materials to avoid)

Strong Oxidizing Agents

HAZARDOUS DECOMPOSITION PRODUCTS

Small amounts of Carbon Monoxide or Sulfur Dioxide during combustionHAZARDOUS
POLYMERIZATION

MAY OCCUR

WILL NOT OCCUR

X

CONDITIONS TO AVOID

SECTION VII - SPILL OR LEAK PROCEDURESSTEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Same as for Mineral Oils

WASTE DISPOSAL METHOD

Same as for mineral oil**SECTION VIII - SPECIAL PROTECTION INFORMATION**

RESPIRATORY PROTECTION (Specify type)

NON E

VENTILATION

LOCAL EXHAUST

MECHANICAL (General)

SPECIAL

OTHER

PROTECTIVE GLOVES

EYE PROTECTION

If desired--use safety goggles.

OTHER PROTECTIVE EQUIPMENT

SECTION IX - SPECIAL PRECAUTIONSPRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
same as for mineral oils

OTHER PRECAUTIONS

None

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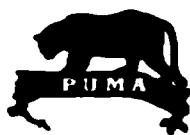
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Form OSHA-20
Rev. May 72

TRW-00346

0908-1712

Copper Brass



Puma Chemical Corp.

95 Cherry St., Farmingdale, Long Island, N.Y. 11735

APPROVED

JUN 08 1987

ENVIRONMENTAL
ENGINEERING

JANUARY 1987

REF: **C-12 ACTIVATOR**

THIS LETTER IS TO ASSURE YOU THAT THE MATERIAL SAFETY DATA SHEET (MSDS) WE ARE FURNISHING YOU FOR THE REFERENCED PRODUCTS LISTS ALL CHEMICALS IN THIS PRODUCT GREATER THAN ONE PERCENT BY VOLUME OR WEIGHT AND LISTED IN OSHA 1910. 1000 THROUGH 1046.

THE MSDS FURNISHED TO YOU SHOWS THE CHEMICAL NAMES AND THRESHOLD LIMIT VALUES AS THEY ARE LISTED IN THE CURRENT OSHA REGULATION.

PUMA CHEMICAL CORP.

ANDREW PUMA PRES.

NAME OF CHEMICAL COMPOUNDS:

E.D.T.A.	(WATER SOFTNER)
SODIUM LAURETH SULFATE	(WETTING AGENT)
SOBIRTAL	(EMULSIFYING AGENT)
DEOXIDIZING AGENT	(DEOXIDIZER)
NON FATTY WETTING AGENTS	(SOAPS)
	(PH 7.6)

(trade Names)

Area Code: 516 MYrtle 4-4114
Telex# TWX# 5102220866
A.B. PUMA CHEM. FRDLF

TRW-00347

0908-1713

Area Code: 516 MYrtle 4-4114
Telex# TWX# 5102220868
A.B. PUMA CHEM. FRDLE N.Y.



Puma Chemical Corp.
95 Cherry St., Farmingdale, Long Island, N.Y. 11735

**MATERIAL SAFETY DATA SHEET
(OSHA FORM)
C-12 ACTIVATOR**

CERTIFIED BY PUMA CHEMICAL CORP.
CERTIFICATION ON OSHA FORM ON C-12 ACTIVATOR.

HAZARDOUS INGREDIENTS:

VAPOR DENSITY	NONE
VAPOR PRESSURE	NONE
FLASH POINT	NONE
FLAMMABLE	NONE
TOXICITY	NONE

HEALTH HAZARD INFORMATION ON C-12 ACTIVATOR

FIRST AID PROCEDURES	WASH SKIN OR EYES WITH TAP WATER
IRRITATION	NONE
SKIN CONTACT	NONE, JUST WASH WITH TAP WATER
SKIN ABSORPTION	NONE
EFFECTS ON OVER EXPOSURE	NONE

CONTAINS: WETTING AGENT (SOAPS) NON FATTY, AND DE OXIDIZING AGENT.

WASTE DISPOSAL METHODS

DILUTE WITH WATER, AND THROW AWAY IN THE DRAIN.

SPECIAL PROTECTION NONE

SPILL OR LEAK PROCEDURES: RINSE OFF WITH TAP
WATER AND FLUSH IN
DRAIN.
NON CORROSIVE PH 7.6

PREPARED BY

PUMA CHEMICAL CORP.
95 CHERRY ST., BOX # 339
FARMINGDALE, N.Y. 11735

TRW-00348



23000 ST. CLAIR AVE. • CLEVELAND, OHIO 44117 • 800-328-9745
EMERGENCY 24 HOUR CHEMTREC NO. 800-424-9300

Experimental
Dyot 230

MATERIAL SAFETY DATA SHEET

08501

Section I

Identity	Date Printed	06/01/88	Date Revised	10/22/87
CP-202 GRAY PRIMER	NFPA CODE:			
	HEALTH: 2	FLAMMABILITY: 3	REACTIVITY: 1	

Section II - Hazardous Ingredients

Hazardous Ingredients	CAS #	Health Hazards	ACGIH TLV-TWA
BUTYL CELLOSOLVE (2-BUTOXYETHANOL)	111-76-2	COMBUSTIBLE STEL - 75 PPM	25 PPM SKIN
ETHANOL (ETHYL ALCOHOL)	64-17-5	FLAMMABLE	1900 MG/CUM
ISOPROPYL ALCOHOL (ISOPROPANOL)	67-63-0	FLAMMABLE	400 PPM
PHENOL	108-95-2	NIOSH - 400 PPM SKIN	STEL - 500 PPM 19 MG/CUM
SILICON DIOXIDE		DUST	2 MG/CUM
TITANIUM DIOXIDE	13463-67-7	TOTAL DUST	10 MG/CUM
SECONDARY BUTYL ALCOHOL	78-92-2	FLAMMABLE	100 PPM

NO COMPONENT WAS FOUND TO BE CARCINOGENIC IN NTP, IARC OR OSHA

Section III - Physical/Chemical Characteristics

Boiling Point	180 - 250 DEG F	Specific Gravity(H ₂ O=1)	1.01
Vapor Pressure(mm Hg)	NOT DETERMINED	Percent Volatile By Volume (%)	78
Vapor Density (AIR=Reference)	HEAVIER	Evaporation Rate (Ether=Reference)	SLOWER
Water Soluble	NO		

Appearance and Odor
GRAY LIQUID, MILD ODOR

Section IV - Fire and Explosion Hazard Data

Flash Point (Method Used)	Flammable Limits	LEL	UEL
53 DEG F TCC	LOWEST VALUE	1.0	

Extinguishing Media CARBON DIOXIDE. DRY CHEMICAL.

Special Fire Fighting Procedures IF EXPOSED TO HEAT, PRESSURE WILL
BUILD UP IN CONTAINER.

Unusual Fire and Explosion Hazards A STRAIGHT WATER STREAM WOULD SPREAD
FIRES. STATIC ELECTRICITY COULD CAUSE IGNITION.

TRW-00349

METAL PROCESSING SYSTEMS

7100000-00 MAN-GILL CHEMICAL CO.

0908-1715



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MATERIAL SAFETY DATA SHEET

CP-202 GRAY PRIMER

08501

Section V - Reactivity Data

STABILITY	Unstable	Conditions to Avoid
	Stable *	AVOID PROLONGED STORAGE AT ELEVATED TEMPERATURES.

INCOMPATIBILITY (Materials to Avoid)
STRONG OXIDIZERS

Hazardous Decomposition Products
OXIDES OF CARBON AND NITROGEN

HAZARDOUS	May Occur	Conditions to Avoid
POLYMERIZATION	Will Not Occur *	NONE

Section VI - Health Hazard Data

Effects of Overexposure MAY CAUSE SKIN IRRITATION OR DRYING AND CRACKING. MAY IRRITATE THE EYES AND CAUSE BLURRED VISION. INHALATION MAY IRRITATE THE RESPIRATORY TRACT AND CAUSE HEADACHES, NAUSEA, VOMITING AND DIZZINESS. INGESTION MAY CAUSE NAUSEA AND VOMITING. MAY CAUSE HEMOLYSIS AND HEMOGLOBINURIA. TARGET ORGANS THAT MAY BE AFFECTED ARE BLOOD, KIDNEYS SKIN, BLOOD, EYES AND RESPIRATORY SYSTEM.

Emergency and First Aid Procedures

Eye (Contact): FLUSH EYES WITH COPIOUS AMOUNTS OF WATER FOR 15 MINUTES AND CONTACT PHYSICIAN IMMEDIATELY.

Skin (Contact): WASH WITH SOAP AND WATER. CONTACT PHYSICIAN IF IRRITATION PERSISTS.

Ingestion (Swallowing): DO NOT INDUCE VOMITING. DRINK LARGE QUANTITIES OF WATER AND/OR MILK. CONSULT PHYSICIAN IMMEDIATELY.

Inhalation (Breathing): REMOVE TO FRESH AIR. AID IN BREATHING IF NECESSARY AND GET IMMEDIATE MEDICAL ATTENTION IF NEEDED.

Section VII - Precautions for Safe Handling & Use

Steps to be taken in Case Material is Released or Spilled

WEAR APPROPRIATE PROTECTIVE EQUIPMENT. REMOVE IGNITION SOURCES. CONTAIN SPILL. ABSORB WITH INERT MATERIAL AND DISPOSE.

Waste Disposal Method: DISPOSE IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS.

Handling and Storage

DO NOT STORE OR USE NEAR HEAT, SPARKS, OR FLAME. DO NOT STORE NEAR COMBUSTIBLE MATERIAL. DO NOT STORE IN DIRECT SUNLIGHT. WHEN SANDING DRY FILM, USE NIOSH APPROVED DUST MASK. KEEP CONTAINER TIGHTLY CLOSED WHEN NOT IN USE.

Other Precautions

SHOWERS AND EYE WASH FOUNTAINS SHOULD BE MADE AVAILABLE WHERE CHEMICALS ARE USED.

METAL PROCESSING SYSTEMS



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MATERIAL SAFETY DATA SHEET

CP-202 GRAY PRIMER

08501

Section VIII - Control Measures

Respiratory Protection (Specify Type)

USE NIOSH APPROVED EQUIPMENT WHEN AIRBORNE EXPOSURE LIMITS ARE EXCEEDED.

VENTILATION

Local

Mechanical

RECOMMENDED TO MAINTAIN BELOW TLV

Protective Gloves

NEOPRENE RUBBER

Eye Protection

SPLASH GOGGLES OR FACE SHIELD

Other Protective Clothing or Equipment

PROTECTIVE CLOTHING SUFFICIENT TO PREVENT SKIN CONTACT.

Work/Hygienic Practices

WASH THOROUGHLY BEFORE EATING, SMOKING OR USING TOILET FACILITIES.

TRW-00351

0908-1717

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METAL PROCESSING SYSTEMS

INTER-OFFICE COMMUNICATION

FORM NO SF2

FROM: Don Moon
➔ TO: Jennis Borsuk DATE 6-5-87
SUBJECT Die Cleaner Anti-rust FTED

Jennis - There is a good chance that we will opt to use The Stewart Hall rust inhibitor outlined in the attached data sheet. Please advise your approval - or otherwise - on this.

RETURN TO: Don Moon

SIGNATURE

JennisDATE 6/8REPLY: Don

I don't see any problem using the substance as long as personal protective clothing is worn. The concentrated rust inhibitor is very corrosive.

Spent solution needs to be handled ~~it~~ as a hazardous waste.

Please advise me of the day you start to use.

Thanks

SIGNATURE

Jennis

REPLIER'S COPY - RETAIN FOR YOUR FILES

TRW-00352

0908-1718

MATERIAL SAFETY DATA SHEET

222 WASHINGTON STREET

STEWART HALL
CHEMICAL CORPORATION

MT. VERNON, N.Y. 10553

SECTION I

Manufacturers Name Stewart-Hall Chemical Corporation	Emergency Telephone (914) 668-6300
Address 222 Washington St., Mount Vernon, NY 10553	
Chemical Name and Synonyms Corrosion Inhibitor	Trade Name and Synonyms CPF-100
Chemical Family Alkaline Corrosion Inhibitor	Formula See Below

SECTION II - INGREDIENTS

	C.A.S. NO.	W/V	%
Triethanolamine 85%	102-71-6+111-42-2		> 1.0
Sodium Tolyltriazole	64665-57-2		> 1.0
Sodium Meta Silicate	6834-92-0		> 1.0
Contains no other			
"hazardous substances"			

SECTION III - PHYSICAL DATA

Boiling Point (°F.) 212°F	Specific Gravity (H ₂ O=1)	1.047
Vapor Pressure (mm Hg.)	Percent Volatile By volume (1%)	80%
Vapor Density (Air=1)	Evaporation Rate (water =1)	1
Solubility in Water 100%	pH of 1% solution	~ 11.0
Appearance and Odor light yellow - odor slight		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used) N/A	Flammable Limits	Le1	Ue1
Extinguishing Media N/A			
Special Fire Fighting Procedures			
N/A			
Unusual Fire and Explosion Hazards			
N/A			

TRW-00353

SECTION V - HEALTH HAZARD DATA	
Threshold Limit Value	Not tested
Effects of Overexposure	Eyes- alkaline liquid - corrosive - skin irritant
Emergency and First Aid Procedures	Eyes - flush with water for 15 minutes seek medical attention. Skin - wash well with soap and water.

SECTION VI - REACTIVITY DATA		
Stability	Unstable	Conditions to Avoid
	Stable X	
Incompatability (Materials to avoid)	acids	
Hazardous Decomposition Products	none	
Hazardous Polymerization	May Occur	Conditions to Avoid
	Will Not Occur X	

SECTION VII - SPILL OR LEAK PROCEDURES	
Steps to be taken in case material is released or spilled	
Use chemical absorbent or flush with water to drain.	
Waste Disposal Method	small spills - Sanitary sewer system flush well with water.
Large spills - pump back into container.	

SECTION VIII - SPECIAL PROTECTION INFORMATION		
Respiratory Protection (Specify Type) None		
Ventilation	Local Exhaust	Special
	Mechanical (General)	Other
Protective Gloves	Rubber	Eye Protection goggles
Other Protective Equipment apron		

SECTION IX - SPECIAL PRECAUTIONS	
Precautions To Be Taken In Handling and Storing	
Keep away from acids.	
Other Precautions	

TRW-00354

Harvey Prock

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved
OMB No. 44-R1387

MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing,
Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME CRC Chemicals USA		EMERGENCY TELEPHONE NO. 215-674-4300
ADDRESS (Number, Street, City, State, and ZIP Code) 885 Louis Drive, Warminster, PA 18974		
CHEMICAL NAME AND SYNONYMS		TRADE NAME AND SYNONYMS CRC 5-56 (Aerosol)
CHEMICAL FAMILY Rust Preventive	FORMULA	

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV (Units)
Volatiles - High flash aliphatic hydrocarbon solvent				53	200
Propane-Isobutane (Propellant)				28	1000
Non-Volatiles - Organic corrosion inhibitor in high flash paraffinic oil				19	--

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	380°F	SPECIFIC GRAVITY (H ₂ O=1)	.8167
VAPOR PRESSURE (mm Hg.)	Solvent @ 68°F 0.2	PERCENT VOLATILE BY VOLUME (%)	82
VAPOR DENSITY (AIR=1)	Solvent 5.52	EVAPORATION RATE (Toluene =1)	Solvent 0.01
SOLUBILITY IN WATER	negligible		
APPEARANCE AND ODOR	Amber liquid, pleasant odor		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used) 175°F COC (Aerosol Concentrate)	FLAMMABLE LIMITS Propellant portion	Lel 1.8%	Uel 9.5%
EXTINGUISHING MEDIA CO₂, Foam, Dry chemicals		vol.	vol.
SPECIAL FIRE FIGHTING PROCEDURES The flash point of the propellant used is -40°F COC and is considered extremely flammable.			
UNUSUAL FIRE AND EXPLOSION HAZARDS Aerosol cans may explode at temperatures above 120°F.			

TRW-00355

SECTION V - HEALTH HAZARD DATA			
THRESHOLD LIMIT VALUE 200 ppm			
EFFECTS OF OVEREXPOSURE Eye irritation, drying of skin, excessive inhalation causes dizziness and nausea.			
EMERGENCY AND FIRST AID PROCEDURES Eye contact-Flush with large amounts of water; Skin contact-wash with mild soap and water, apply a skin cream; Inhalation-remove to fresh air and apply artificial respiration if necessary. Ingestion-do not induce vomiting, call a physician. In any case, if symptoms persist get medical aid.			
SECTION VI - REACTIVITY DATA			
STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	Heat, sparks & open flame.
INCOMPATIBILITY (Materials to avoid) Strong oxidizing agents.			
HAZARDOUS DECOMPOSITION PRODUCTS Combustion yields normal hydrocarbon combustion products plus acid halides.			
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII - SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Normally not applicable to aerosol packages. If spill is large enough, flush with water, keep flames, heat and sparks from area. Use respiratory protection if necessary. Small spills may be picked up with absorbant material.	
WASTE DISPOSAL METHOD Do not incinerate or puncture aerosol cans. Bury or discard in conformance with Local, State or Federal regulations. Full or partially filled containers must be considered "Hazardous Waste" and discarded as such.	

SECTION VIII - SPECIAL PROTECTION INFORMATION		
RESPIRATORY PROTECTION (Specify type) Use self contained breathing apparatus for concentrations above TLV.		
VENTILATION	LOCAL EXHAUST To maintain vapor conc. below TLV	SPECIAL
	MECHANICAL (General)	OTHER
PROTECTIVE GLOVES Not normally needed for aerosol use.		EYE PROTECTION
OTHER PROTECTIVE EQUIPMENT		

SECTION IX - SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING Do not store aerosol cans above 120°F. Protect cans from puncturing.	
OTHER PRECAUTIONS Do not spray into open flame. Use with adequate ventilation.	

TRW-00356

MSDS IDENTIFICATION NUMBER	DATE ISSUED	ISSUED BY	EMERGENCY PHONE NUMBER
CS-010	March 1, 1989	Environmental Engineering Department	Ulbrich 203-239-4481 Chemtrec 800-424-9300
TRADE NAME: Carbon Steels		FORMULA: Alloy composed of varying concentrations of elements listed in Section II.	
I. PRODUCT IDENTIFICATION CHEMICAL NAME: See Section II for Alloy Designations		CHEMICAL FAMILY: Alloy	

II. HAZARDOUS CONSTITUENTS

STANDARD CARBON STEELS GROUP X

AISI-SAE 1050; 1065; 1070; 1074; 1075; 1095.

DANGER
INHALATION OF DUST OR FUME MAY CAUSE SERIOUS LUNG INJURY. SKIN, EYE AND MUCOUS IRRITATION MAY OCCUR.

- The standard carbon steels alloy products identified above may contain, in varying concentrations, the following elemental constituents: carbon, iron and manganese. For specific concentrations of these and other elements present, refer to the Material Safety Data Sheet (MSDS) for this product.
- Inhalation of metal dust or fume generated by the use of these alloys may cause adverse health effects such as reduced lung function, nasal and mucous membrane irritation. Exposure to dust or fume generated by the use of these alloys may also cause eye irritation, skin rash and effects on other organ systems.
- Chrome, nickel and some of their compounds are listed in the 3rd Annual Report on Carcinogens as prepared by the National Toxicology Program (NTP) as well as the International Agency for Research on Cancer (IARC) Monograph Series. The following information is a summary of findings reported to date:

Element or Certain
Compounds Evaluated
or Both
(Identified by
Element Shown)

Determination/Evaluation	CHROME	NICKEL
Evidence of carcinogenicity to humans:	Sufficient	Limited
Evidence of carcinogenicity to animals:	Sufficient	Sufficient

- Avoid breathing of dust or fume. If the use of this material produces dust or fume, use appropriate ventilation controls, personal protective equipment or both. For additional information refer to the Material Safety Data Sheet (MSDS) for this product.

NOTICE: SECTION 313

Some of the previously listed chemicals are subject to annual reporting of releases into the environment under Section 313 of the Emergency Planning and Community Right-To-Know-Act of 1986. It is the responsibility of the user to verify whether or not his or her facility is in compliance with all Federal and State Environmental regulations.

NOTICE: CALIFORNIA LIST

Our Material Safety Data Sheets (MSDS) have been reviewed for inclusion of any chemicals listed under the Safe Drinking Water and Toxic Enforcement Act of 1986 (California Proposition 65). We at this time do not report any of the "listed" chemicals as constituent components in any alloys currently processed by our company.

ALLOY AISI-SAE	UNS No.	CONSTITUENT(S) C	% Maximum unless otherwise shown. Mn	Fe	Other	DENSITY lbs/cu in	(approx.) MELTING PT. degree (F)
1050	G10500	.48-.55	.60-.90	BAL		.283	2700
1065	G10650	.60-.70	.60-.90	BAL		.283	2700
1070	G10700	.65-.75	.60-.90	BAL		.283	2700
1074	G10740	.70-.80	.50-.80	BAL		.283	2700
1075	G10750	.70-.80	.40-.70	BAL		.283	2700
1095	G10950	.90-1.03	.30-.50	BAL		.283	2700
CAS Number		7440-44-0	7439-96-5	7439-89-6			
Contaminant & Exposure Limits		Not Listed	As Dust As Fume	As FeO Fume As Fe			
(mg/m3) PEL TLV			5(c) 5(c) 5(c) 1	10 5			

TRW-00357

III. PHYSICAL PROPERTIES	
FREEZING POINT: Not Applicable	VAPOR PRESSURE (mmHg): Not Applicable
MELTING POINT: See Section II	VAPOR DENSITY (AIR = 1): Not Applicable
BOILING POINT: Not Applicable	SPECIFIC GRAVITY (H ₂ O = 1): See Section II
SUBLIMES @: Not Applicable	SOLUBILITY IN WATER = None
EVAPORATION RATE: Not Applicable	% VOLATILES BY VOLUME: None
APPEARANCE AND ODOR: Solid – Silver Gray Color – No Odor	
IV. FIRE, EXPLOSION AND REACTIVITY INFORMATION	
FLASH POINT (WITH TEST METHOD) None	FLAMMABLE (EXPLOSIVE) LIMITS V/V% LEL: None UEL: None
EXTINGUISHING MEDIA	This alloy is noncombustible. Use extinguishing media appropriate to the surrounding fire.
SPECIAL FIREFIGHTING PROCEDURES	If this material is reduced to powder form, caution must be used to prevent fire or explosion. To extinguish a metal powder fire use dry sand, dry graphite or other class "D" fire extinguishing powder.
UNUSUAL FIRE AND EXPLOSION HAZARDS	No unusual fire or explosion hazards are associated with this material.
GENERAL REACTIVITY	This alloy is a stable material.
INCOMPATIBILITY (MATERIALS TO AVOID)	Avoid contact with mineral acids and oxidizing agents which may generate hydrogen gas; the evolution of hydrogen may be an explosion hazard.
HAZARDOUS DECOMPOSITION PRODUCTS	Various elemental metals and metal oxides may be generated from melting or gross handling operations. Refer to Section II for permissible exposure limits.
V. HEALTH HAZARD INFORMATION	
PRIMARY ROUTE(S) OF EXPOSURE	INHALATION: Inhalation of metal dust, fume or powder may result from melting, gross handling, casting, welding, grinding, crushing or similar operations which generate airborne metal particulate during use of this material.
	INGESTION: Hand, clothing, food and drink contact with metal dust, fume or powder can cause ingestion of particulate during hand to mouth activities such as eating, drinking, smoking, nail biting, etc.
	SKIN: Skin contact with this material may cause, in some sensitive individuals an allergic response if elements such as chrome, cobalt, copper and nickel are present. In the form of metal dust or powder, skin contact or abrasion may also cause irritation or dermatitis.
	EYES: Particulate metal (dust, fume or powder) may be dangerous to the eye and surrounding tissue. Airborne particulate (chips, dust or powder) is always a potential problem as well as inserting fingers into the eye socket if the hand or clothing is contaminated with metal particulate.

V. HEALTH HAZARD INFORMATION (CONTINUED)

TOXICITY	<p>There is no information on the toxicity of this alloy. Under normal handling and use of the solid form of this material there are a few health hazards. Cutting, welding, melting, grinding, etc. of this material will produce dust, fume or particulate containing the component elements of this material. Exposure to the dust, fume or particulate may present significant health hazards which are referable to the elemental constituents in Section II.</p>
EFFECTS OF OVEREXPOSURE	<p>ACUTE: The metal dust and fumes of those elements in Section II can cause irritation to the skin, eye and mucous membranes. Contact with chrome, cobalt, copper and nickel may cause allergic skin reactions. As dust, powder or fume, exposure which abrades the skin can cause irritation and dermatitis. Injury to the eyes is generally a result of particulate irritation or mechanical injury to the cornea or conjunctiva by dust or particulate. Excessive inhalation of aluminum, cobalt, copper, manganese, nickel and vanadium can cause respiratory irritation, cough, bronchitis, chills, "fume fever" and asthma-like symptoms.</p>
	<p>CHRONIC: Respiratory disease with symptoms ranging from shortness of breath and cough to permanent disability due to loss of lung function, fibrosis or subsequent effects on the heart may be caused by excessive exposure to dust or fumes containing cobalt, nickel, titanium and tungsten. Central nervous system depression has been identified with excessive manganese exposure. Nickel and chrome metal and certain compounds have been linked to nasal, bronchial and lung cancers. Aluminum and iron have been indicated to cause gastro-intestinal disorders and non-significant changes in the lung. Chronic health effects specific to an element(s) may be difficult to detect due to the numerous elemental constituents in this alloy.</p>
CARCINOGENIC REFERENCES	<p>Nickel and chrome metal and some of their compounds have been listed in the 3rd Annual Report on Carcinogens as prepared by the National Toxicology Program (NTP) as well as the International Agency for Research on Cancer (IARC) Monograph Series. Detailed information from these sources may be obtained from the following: IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man; Geneva, WHO, IARC 1972-1977 (Multivolume work) 49 Sheridan Street, Albany, NY 12219. Third Annual Report on Carcinogens, Summary, September, 1983 NTP 82-330 NTP Public Information Office, MD B2-04 Box 12233, Research Triangle Park, NC 27709.</p>
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE	<p>Individuals who may have had allergic reaction or sensitivity to metals such as chrome, copper, cobalt and nickel may encounter skin rash or dermatitis if skin contact with this product occurs. Persons with impaired pulmonary function, airway diseases and conditions such as asthma, emphysema, chronic bronchitis, etc. may incur further disability if excessive concentrations of dust or fume are inhaled. If prior damage or disease to the Neurologic (nervous), Circulatory, Hematologic (blood) or Renal (kidney) systems has occurred, proper screening or examinations should be conducted on individuals who may be exposed to further risk if handling and use of this material causes excessive exposure.</p>

VI. EMERGENCY AND FIRST AID PROCEDURES		
INHALATION	Breathing difficulty caused by inhalation of dust or fume requires removal to fresh air. If breathing has stopped, perform artificial respiration and obtain medical assistance at once.	
INGESTION	Swallowing metal powder or dust can be treated by having the affected person swallow large quantities of water and attempting to induce vomiting if conscious. Obtain medical assistance at once.	
SKIN	Skin cuts and abrasions can be treated by standard first aid. Skin contamination with dust or powder can be removed by washing with soap and water. If irritation persists obtain medical assistance.	
EYES	Dust or powder should be flushed from the eyes with copious amounts of clean water. If irritation persists obtain medical assistance. Contact lenses should not be worn if working with metal dusts and powders.	
VII. INDUSTRIAL HYGIENE CONTROL MEASURES		
VENTILATION	Local exhaust ventilation should be used to control exposure to airborne dust and fume whenever possible.	
RESPIRATORY PROTECTION	Use NIOSH approved respirators as specified by an Industrial Hygienist or qualified Safety Professional. Lung function tests are recommended for users of negative pressure devices.	
PROTECTIVE GLOVES	Wear gloves to prevent metal cuts and skin abrasions particularly during handling of wrought forms, solid metal sheet, strip or tube.	
EYE PROTECTION	Wear safety glasses when risk of eye injury is present particularly during machining, grinding, welding, powder handling, etc.	
OTHER PROTECTIVE EQUIPMENT	Protective clothing such as uniforms, disposable coveralls, safety shoes, etc. may be required during metal handling operations as appropriate to the circumstances of exposure.	
RECOMMENDED MONITORING PROCEDURES	ENVIRONMENTAL SURVEILLANCE: Exposure to the elements identified in Section II can be best determined by having air samples taken in the employee breathing zone, work area or department.	MEDICAL SURVEILLANCE: Lung function tests, chest x-rays and routine physical examinations may be useful to determine effects of dust or fume exposure.
VIII. ENVIRONMENTAL PROTECTION INFORMATION		
STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED	In solid form this material poses no special clean-up problems. If this material is in powder or dust form, clean-up should be conducted with a vacuum system utilizing a high efficiency particulate air filtration system. Caution should be taken to minimize airborne generation of powder or dust and avoid contamination of air and water. Properly label all materials collected in waste container.	
WASTE DISPOSAL METHOD	Prior to disposal consider if the material has recovery value. State or federal regulations may require specific labeling, packing, storage, transportation and disposal procedures. Contact an Environmental Engineer or consultant familiar with waste disposal regulations.	
ENVIRONMENTAL HAZARDS	In solid form this material poses no special environmental problems. Metal powders or dusts may have significant impact on air and water quality. Airborne emissions, spills and releases to the environment (discharge to streams, sewer systems, ground water, surface soil, etc.) should be controlled immediately. If such potential for a spill exists it is advisable to develop an emergency spill reponse plan.	

IX. SPECIAL PRECAUTIONS														
HANDLING PRECAUTIONS	This product must be handled accordingly to the size, shape and quantity of material involved. Solid metal may require use of hoists, cranes, etc. Powders should be moved or transported to minimize spill or release potential.													
STORAGE PRECAUTIONS	In solid form this material poses no special storage problems. Store metal and metal powder in a dry area. Do not store adjacent to mineral acids. Fine metal powder should be kept away from flames and sources of ignition.													
X. DOT SHIPPING REQUIREMENTS														
SHIPPING NAME	Not Applicable	IDENTIFICATION NUMBER Not Applicable												
HAZARD CLASS	Not Applicable	LABEL(S) REQUIRED Not Applicable												
ADDITIONAL INFORMATION														
<p style="text-align: center;">The following is the label text which accompanies this product during shipment:</p> <p style="text-align: center; margin-top: 20px;">STAINLESS STEEL AND RELATED ALLOYS GROUP</p> <p style="text-align: center; margin-top: 20px;">INHALATION OF DUST OR FUME MAY CAUSE SERIOUS LUNG INJURY. SKIN, EYE AND MUCOUS MEMBRANE IRRITATION MAY OCCUR.</p>														
<ul style="list-style-type: none"> The heat resistant alloy products identified above may contain, in varying concentrations, the following elemental constituents: aluminum, cobalt, chromium, copper, iron, manganese, molybdenum, nickel and tungsten. For specific concentrations of these and other elements present, refer to the Material Safety Data Sheet (MSDS) for this product. Inhalation of metal dust or fume generated by the use of these alloys may cause adverse health effects such as reduced lung function, nasal and mucous membrane irritation. Exposure to dust or fume generated by the use of these alloys may also cause eye irritation, skin rash and effects on other organ systems. Chrome, nickel and some of their compounds are listed in the 3rd Annual Report on Carcinogens as prepared by the National Toxicology Program (NTP) as well as the International Agency for Research on Cancer (IARC) Monograph Series. The following information is a summary of findings reported to date: <table style="margin-left: auto; margin-right: auto; border: none; width: 80%;"> <tr> <td></td> <th colspan="2" style="text-align: center; padding: 5px;">Element or Certain Compounds Evaluated or Both (Identified by Element Shown)</th> </tr> <tr> <th style="text-align: center; padding: 5px;">Determination/Evaluation</th> <th style="text-align: center; padding: 5px;">Chrome</th> <th style="text-align: center; padding: 5px;">Nickel</th> </tr> <tr> <td style="padding: 5px;">Evidence of carcinogenicity to humans:</td> <td style="text-align: center; padding: 5px;">Sufficient</td> <td style="text-align: center; padding: 5px;">Limited</td> </tr> <tr> <td style="padding: 5px;">Evidence of carcinogenicity to animals:</td> <td style="text-align: center; padding: 5px;">Sufficient</td> <td style="text-align: center; padding: 5px;">Sufficient</td> </tr> </table> <ul style="list-style-type: none"> Avoid breathing dust or fume. If the use of this material produces dust or fume, use appropriate ventilation controls, personal protective equipment or both. For additional information refer to the Material Safety Data Sheet (MSDS) for this product. 				Element or Certain Compounds Evaluated or Both (Identified by Element Shown)		Determination/Evaluation	Chrome	Nickel	Evidence of carcinogenicity to humans:	Sufficient	Limited	Evidence of carcinogenicity to animals:	Sufficient	Sufficient
	Element or Certain Compounds Evaluated or Both (Identified by Element Shown)													
Determination/Evaluation	Chrome	Nickel												
Evidence of carcinogenicity to humans:	Sufficient	Limited												
Evidence of carcinogenicity to animals:	Sufficient	Sufficient												

Content & Description Of Ulbrich Stainless Steels & Special Metals, Inc.
Material Safety Data Sheets

ENVIRONMENTAL ENGINEERING DEPARTMENT
Ulbrich Stainless Steels & Special Metals, Inc.
57 Dodge Avenue
North Haven, CT 06473
(203) 239-4481

SECTION I – PRODUCT IDENTIFICATION

Chemical Name: A name consistent with the nomenclature system of the International Union of Pure & Applied Chemistry (IUPAC) or the Chemical Abstracts Service (CAS).

Trade Name: The name the product is sold by, i.e., the product name.

Chemical Family: A general designation for a group of elements or compounds.

Formula: The scientific designation for an element or compound.

SECTION II – HAZARDOUS CONSTITUENTS

Constituent(s): The chemical component(s) of the product. A hazardous constituent is a chemical which is a physical hazard or health hazard.

Percent: The amount of component or range present in the product and expressed on a weight basis.

CAS Number: A specific chemical identification number assigned by the Chemical Abstracts Service. The lack of a CAS Number for any given chemical or mixture indicates that a number may not have been assigned.

NIOSH RTECS Number: The National Institute for Occupational Safety & Health (NIOSH) Registry of Toxic Effects of Chemical Substances (RTECS) Access Number for a specific element or compound's toxicological data.

OSHA PEL: The Occupational Safety & Health Administration (OSHA) Permissible Exposure Limit (PEL) – usually a time weighted average (TWA) ceiling limit (C) or maximum peak exposure limit (P) expressed as PPM (parts per million) or as Mg/M³ (milligrams per cubic meter).

ACGIH TLV: The American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) – in many cases, identical to the OSHA PEL. ACGIH also recommends a short term exposure limit (STEL) for certain substances that should not be exceeded at any time.

SECTION III – PHYSICAL PROPERTIES

Freezing Point: The temperature at which a liquid changes to a solid. A range may be given.

Melting Point: The temperature at which a solid changes to a liquid. A range may be given.

Boiling Point: The temperature at which a liquid changes to a vapor. Usually expressed at sea level pressure (760mmHg).

Sublimes @: The temperature at which a solid changes directly to vapor.

Evaporation Rate: Indicated as faster or slower than Ethyl Ether unless stated.

Appearance and Odor: A description of the product in terms of form, color, odor, etc.

Vapor Pressure (mmHg): The pressure of a saturated vapor above a liquid expressed as mmHg at 20°C, unless stated at a different temperature.

Vapor Density (Air = 1): The relative density of a vapor or gas compared to an equal volume of air. Air is equivalent to 1.0.

Specific Gravity (H₂O = 1): The ratio of the weight of a volume of material to the weight of an equal volume of water. Water is equivalent to 1.0 @ 4°C. The term "DENSITY" describes the concentration of matter as the mass per unit volume, e.g., pounds/cubic inch.

Solubility In Water: The degree to which a material is capable of dissolving in water.

% Volatiles By Volume: The volumetric percentage of volatile compounds in a product.

SECTION IV – FIRE, EXPLOSION AND REACTIVITY INFORMATION

Flash Point (With Test Method): The lowest temperature at which a vapor/air mixture will propagate a flame above the surface of the material being tested.

Flammable (Explosive) Limits V/V%:

LEL: LOWER EXPLOSION LIMIT: The lowest vapor concentration in air at which ignition by spark or flame will occur.

UEL: UPPER EXPLOSION LIMIT: The highest vapor concentration in air at which ignition by spark or flame will occur.

Extinguishing Media: The type of fire extinguishing media to be used taking into account the type of chemical and its flammable characteristics.

Special Firefighting Procedures: Indicates equipment to protect firement from toxic products of combustion.

Unusual Fire and Explosion Hazards: Chemical changes that may occur under heat or fire conditions.

General Reactivity: The tendency of a material to undergo chemical reaction with the release of energy.

Incompatibility (Materials To Avoid): Materials which could cause dangerous reactions.

Hazardous Decomposition Products: The breakdown of a material into compounds or elements that may have specific hazard properties different than the original material.

SECTION V – HEALTH HAZARD INFORMATION

Primary Route(s) Of Exposure:

Inhalation: The breathing in of a gas, dust, fume, vapor, or mist as a contribution to exposure.

Ingestion: The swallowing of a substance as a contribution to exposure.

Skin: The contribution to exposure by the cutaneous route, either skin absorption or skin contact.

Eyes: The effect of chemical exposure on the eye.

Toxicity: The available toxicological data usually expressed as lethal dose or lethal concentration of the material or its components. Most toxicity test results are from exposure tests conducted on animals such as rats or mice and caution is recommended in making direct comparison to human beings.

Effect Of Overexposure:

Acute: Rapid effects of exposure with severe symptoms.

Chronic: Effects due to exposure that develop slowly over a long period of time or which recur frequently.

Carcinogenic References: Available references which indicate the potential for a material to cause cancer in man or animals.

Medical Conditions Aggravated By Exposure: Medical conditions that warrant consideration regarding exposure to a toxic substance.

SECTION VI – EMERGENCY & FIRST AID PROCEDURES

Inhalation: Emergency action to address adverse effects due to inhalation of a hazardous material.

Ingestion: Emergency action to address adverse effects due to ingestion of a hazardous material.

Skin: Emergency action to address adverse effects due to skin contact or absorption of a hazardous material.

Eyes: Emergency action to address adverse effects or injury to the eye due to contact with a hazardous material.

SECTION VII – INDUSTRIAL HYGIENE CONTROL MEASURES

Ventilation: Recommended type of ventilation for control of gases or particulate.

Respiratory Protection: General information on the type of respiratory protection recommended.

Protective Gloves: Recommendation for protection to prevent hand contact with the material.

Eye Protection: Recommendation to protect against eye injury.

Other Protective Equipment: Other personal protective equipment (PPE) such as clothing, safety shoes, etc. that may be appropriate to protect against injury or exposure.

Recommended Monitoring Procedures:

Environmental Surveillance: Personal air sampling or related procedures to evaluate exposure of an individual.

Medical Surveillance: Biological monitoring or related tests/examinations to evaluate the effects of exposure to an individual.

SECTION VIII – ENVIRONMENTAL PROTECTION INFORMATION

Steps To Be Taken If Material Is Released Or Spilled: Specifically refers to containment, cleanup and control.

Waste Disposal Method: Refers to recommended disposal practices or applicable regulatory requirements when known.

Environmental Hazards: Refers to information such as aquatic or vegetative toxicity, ambient air pollution concerns, etc. which are available from regulatory or published technical services.

SECTION IX – SPECIAL PRECAUTIONS

Handling Precautions: Safe movement of the product may require specific handling procedures.

Storage Precautions: Safe storage of the product may require specific storage procedures.

SECTION X – DOT SHIPPING REQUIREMENTS

Shipping Name: The approved Department of Transportation (DOT) Shipping Name where applicable.

Hazard Class: The approved DOT Hazard Class where applicable.

Identification Number: Either the United Nations or North American approved identification number referenced by DOT.

Label(s) Required: The required DOT shipping label where applicable.

ADDITIONAL INFORMATION

This section is reserved for remarks which may not be specifically addressed in preceding sections such as Product Hazard Warnings & Label Information.

All information, recommendations, and suggestions contained in these Material Safety Data Sheets concerning our products are believed to be accurate as of the date issued and are based upon information provided by others. Since the actual use of our products by others is beyond our control, Ulbrich Stainless Steels and Special Metals, Inc., service centers, and affiliate companies makes no warranty, expressed or implied, with respect to this information provided and disclaims all liability for any loss or injury arising from reliance upon this information or use of this product. ULBRICH STAINLESS STEELS & SPECIAL METALS, INC. will periodically update this MSDS, however it is the user's responsibility to evaluate the health hazards associated with their processing operations and take appropriate measures to ensure worker safety.



***Ulbrich Stainless Steels
and Special Metals, Inc.***

*57 Dodge Avenue
North Haven, CT 06473
(800) 243-1676 (203) 239-4481*

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved
OSHA 201-24-R-101

MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing,
Shipbuilding, and Shipbreaking (19 CFR 1215, 1216, 1217)

SECTION I

MANUFACTURER'S NAME WASTEWATER SYSTEMS ENGINEERING, INC.	EMERGENCY TELEPHONE NO. 617 584-7300
ADDRESS (Number, Street, City, State, and ZIP Code) 194 South Main Street, West Bridgewater, MA 02379	
CHEMICAL NAME AND SYNONYMS Cationic Polyacrylamide dispersion	TRADE NAME AND SYNONYMS CW-8000
COMMON NAME Synthetic Liquid Polymer	FORMULA $-(CH_2-CH)_n$

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Unit)	ALLOYS AND METALLIC COATINGS	%	TLV (Unit)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FILLER		
ADDITIVES			OTHERS		
OTHERS					
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV (Unit)
Section N/A					

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	-	SPECIFIC GRAVITY (H ₂ O=1)	
VAPOR PRESSURE (mm Hg.)	-	PERCENT VOLATILE BY VOLUME (%)	
VAPOR DENSITY (AIR=1)	-	EVAPORATION RATE (_____ =1)	
SOLUBILITY IN WATER	100%		
APPEARANCE AND ODOR	White Viscous Liquid- Slight Odor		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLAMMABLE LIMIT (Method Used)	FLAMMABLE LIMITS	Let	Uet
None exhibited			
EXTINGUISHING MEDIA			
SPECIAL FIRE FIGHTING PROCEDURES	None		
UNUSUAL FIRE AND EXPLOSION HAZARDS	None		

TRW-00365

SECTION V - HEALTH HAZARD DATA

PERMITTED EXPOSURE LIMIT VALUE

EFFECTS OF OVEREXPOSURE Very low in acute oral toxicity

EMERGENCY AND FIRST AID PROCEDURES Slight skin irritation, protect skin with gloves, mask, and glasses.

EMERGENCY AND FIRST AID PROCEDURES

If ingested, drink plenty of water.

In eyes, flush with large quantities of water.

SECTION VI - REACTIVITY DATA

STABILITY

UNSTABLE

CONDITIONS TO AVOID

STABLE

XXX

No special requirements

HAZARDABILITY (Materials to avoid)

Cationic polymers affect performance - no health hazard

HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS DECOMPOSITION

MAY OCCUR

CONDITIONS TO AVOID

WILL NOT OCCUR

X

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Cover with sand and remove and flush with water until all material is washed away.

ADDITIONAL DISPOSAL METHOD

Normal disposal for solid inert materials.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)

Use face mask, not essential

VENTILATION

LOCAL EXHAUST

SPECIAL

X

MECHANICAL (General)

OTHER

advisable, not essential

PROTECTIVE GLOVES

Required

ADDITIONAL PROTECTION

May use glasses

ADDITIONAL PROTECTIVE EQUIPMENT

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Keep in a cool place.

OTHER PRECAUTIONS

Keep containers closed.

AMERICAN STEEL AND ALUMINUM CORPORATION

Material Safety Data Sheet

Company American Steel and Aluminum Corporation 5 AMERICAN DRIVE MORGANTOWN, PA 26505-0000	Issue Date April 17, 1986	Identification Number C Alloy & Tool
Chemical Name Carbon, Alloy, and Tool Steels	Emergency Phone Number (617) 762-8014	or contact your nearest American Steel office
Trade Name (Common Name) Steel	Form Bar, Sheet, Plate, Tubing, Structural, Pipe, Grating	
Examples: 1018, 12L14, 1117, 11617, 1045, 185, 1215, 1144, 1040, GALV, 1010, 1020, A36, 235, 515-70, T-1, 1050, A120, A106, A53		

SAFETY DIV TRF INC
11 AMES ST
CAMBRIDGE, MA 00000

I. INGREDIENTS

Material or Component	CAS Number	% Weight	Exposure Limits	
			OSHA PEL (mg/m ³)	ACGIH TLV (mg/m ³)
Base Metal:				
Iron (Fe)	7439-89-6	Balance	10 (Fe ₂ O ₃ Fume)	5.0 (Fe ₂ O ₃ Fume)
Alloying Elements				
Aluminum (Al)	7429-90-5	0.10 - 1.8	None Listed	5.0 as welding fume
Carbon (C)	7440-44-0	0.01 - 1.5	None Listed	None Listed
Chromium (Cr)	7440-47-3	0.01 - 12	1.0 as chrome	0.5 as chrome
Cobalt (Co)	7440-48-4	8 Max.	0.1 as cobalt and fume	0.05 as fume
Copper (Cu)	7440-50-8	0.04 - 0.7	0.2 as copper; 1.0 as dust	0.2 as fume; 1.0 as dust
Lead (Pb)	7439-92-1	0.15 - 0.35	0.05 as fume & dust	0.15 as dust and fume
Manganese (Mn)	7439-96-5	0.05 - 2.0	5 as manganese	5 as dust; 1 as fume
Molybdenum (Mo)	7439-98-7	0.01 - 1.10	15 as insoluble compds	10 as insoluble compds
Nickel (Ni)	7440-02-0	0.01 - 10	1.0 as Nickel	1.0 as Nickel
Phosphorous (P)	7723-14-0	0.15 Max	0.1 as Phosphorous	0.1 as Phosphorous
Silicon (Si)	7440-21-3	0.15 - 2.20	None Listed	10 total dust
Sulfur (S)	7704-34-9	0.001 - 0.35	13 sulfur dioxide	5 sulfur dioxide
Tungsten (W)	7440-33-7	0 - 18	None Listed	5 insoluble compds
Vanadium (V)	7440-62-2	0.01 - 1.0	0.5 dust; 0.1 fume	0.05 dust and fume
Zinc (Zn) coating	1314-13-2	10 Max	5.0 as fume	5.0 as fume

Note: The above listing is a summary of elements used in alloying steel. Various grades of steel will contain different combinations of these elements. Trace elements may also be present in minute amounts.

II. PHYSICAL DATA

Material is (At Normal Conditions)		Appearance and Odor	
<input type="checkbox"/> Liquid	<input checked="" type="checkbox"/> Solid	<input type="checkbox"/> Gas	<input type="checkbox"/> Other
		Gray-Black With Metallic Lustre — Odorless	
Acidity/Alkalinity	Approx Melting Point 2750°F	Specific Gravity (H ₂ O = 1) — 7	Vapor Pressure (mm Hg at 20°C)
ph = NA	Boiling Point NA °F	Solubility in water (% by weight) — NA	NA

III. PERSONAL PROTECTIVE EQUIPMENT

Respiratory Protection	Hands, Arms, and Body
NIOSH approved dust/mist/fume respirator should be used during welding or burning if OSHA PEL or TLV is exceeded.	Use appropriate protective clothing such as welders aprons & gloves when welding or burning. Check local codes.
Eye and Face	Other Clothing and Equipment
Safety glasses should always be worn when grinding or cutting; face shields should be worn when welding or burning.	As required

IV. EMERGENCY MEDICAL PROCEDURES

Inhalation:	Remove to fresh air; if condition continues, consult physician.
Eye Contact:	Immediately flush well with running water to remove particulate, get medical attention.
Skin Contact:	If irritation develops, remove clothing and wash well with soap and water. If condition persists, seek medical attention.
Ingestion:	If significant amounts of metal are ingested, seek medical attention.

TRW-00367

V. HEALTH/SAFETY INFORMATION

HEALTH			
<p>Steel products in the natural state do not present an inhalation, ingestion, or contact health hazard. However, operations such as welding, burning, sawing, brazing, grinding, and possibly machining, which results in elevating the temperature of the product to or above its melting point or results in the generation of airborne particulates may present hazards. The above operations should be performed in well ventilated areas. The major exposure hazard is inhalation.</p> <p>Effects of overexposure are as follows:</p> <p>Acute: Excessive inhalation of metallic fumes and dusts may result in irritation of eyes, nose, and throat. Also high concentrations of fumes and dusts of iron-oxide, manganese, copper, zinc, & lead may result in metal fume fever. Typical symptoms consist of a metallic taste in the mouth, dryness and irritation of the throat, chills and fever, and usually last from 12 to 48 hours.</p> <p>Chronic: Chronic and prolonged inhalation of high concentrations of fumes or dust of the following elements may lead to the conditions listed opposite the element:</p> <p style="margin-left: 40px;">Iron (iron-oxide) - Pulmonary effects, siderosis.</p> <p style="margin-left: 40px;">Manganese - Bronchitis, pneumonitis, lack of coordination.</p> <p style="margin-left: 40px;">Chromium - Various forms of dermatitis, inflammation and/or ulceration of upper respiratory tract, and possibly cancer of nasal passages and lungs. Based on available information, there does not appear to be any evidence that exposure to welding fume induces human cancer.</p> <p style="margin-left: 40px;">Nickel - SAME AS CHROMIUM.</p> <p style="margin-left: 40px;">Copper - Pulmonary effects.</p> <p style="margin-left: 40px;">Vanadium - No reported cases of exposure to vanadium.</p> <p style="margin-left: 40px;">Cobalt - Inhalation of cobalt dust may cause an asthma-like disease with cough and dyspnea.</p> <p style="margin-left: 40px;">Molybdenum - Pain in joints, hands, knees and feet.</p> <p style="margin-left: 40px;">Tungsten - Some evidence of pulmonary involvement such as cough.</p> <p style="margin-left: 40px;">Lead - Prolonged exposures can cause behavioral changes, kidney damage, periphery neuropathy characterized by decreased hand-grip strength and adverse reproductive effects.</p> <p style="margin-left: 40px;">Zinc - None reported.</p>			
<p>Occupational Exposure Limits</p> <p style="text-align: center;">See Section I.</p>			
FIRE AND EXPLOSION			
Flash Point	NA °F	Auto Ignition Temperature NA °F	Flammable Limits in Air Lower NA % Upper NA % Extinguishing Media NA
Fire and Explosion Hazards None			Extinguishing Media Not to be Used NA
REACTIVITY			
Stability <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Unstable		Incompatibility (Materials to Avoid) Reacts with strong acids to form hydrogen gas.	
Conditions to Avoid Non-ventilated areas when cutting, welding, burning, or brazing; avoid generation of airborne dusts and fumes. <div style="text-align: right; font-weight: bold;">Keep Area Well Ventilated</div>			
Hazardous Decomposition Products Metallic oxides.			

VI. ENVIRONMENTAL

Spill or leak procedures	Special Precautions: Use good housekeeping practices to prevent accumulation of dust and to keep airborne dust to a minimum.
NA	
Waste Disposal Method	Dust, etc. — follow federal, state, and local regulations regarding disposal.

VII. ADDITIONAL INFORMATION

<p>DISCLAIMER-</p> <p>American Steel and Aluminum makes no warranties, express or implied, including, but not limited to implied warranties of merchantability and fitness for a particular purpose.</p> <p>The information contained in this Material Safety Data Sheet (MSDS) is believed to be correct, but no representations, guarantees or warranties of any kind are made as to its accuracy. Users assume all risk and liability of any use, processing, or handling of any material. Variations in methods, conditions, equipment used to store, handle or process the material and hazards connected with the use of the material are solely the responsibility of the user.</p> <p>This MSDS is intended to be used solely for the purpose of satisfying informational requests. Compliance with all applicable federal, state and local laws and regulations remains the responsibility of the user, and the user has the responsibility to provide a safe workplace to examine all aspects of its operation, and to determine if or when precautions in addition to those described herein are required.</p>
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MATERIAL SAFETY DATA SHEET

USG INDUSTRIES, INC.
101 S. Wacker Drive
Chicago, Illinois 60606

DATE ISSUED 11/11/85
Emergency phone Day (312)321-4383
Night (312)321-4382

SECTION I

PRODUCT: CARLISLE HP Recovery Board
CHEMICAL FAMILY: Wood Fiber (Mixture)

SECTION II

PRODUCT INGREDIENTS
(As Required by 29 CFR 1910.1200)

MATERIALS:	TLV	CAS #	%
Wood Fiber	5mg/M ³	None assigned	92 - 93
Asphalt	5mg/M ³ (fumes)	08052-42-4	7 - 8

SECTION III PHYSICAL DATA

SOLUBILITY IN WATER: Nil
SPECIFIC GRAVITY (H₂O = 1): 0.2 - 0.3
APPEARANCE AND ODOR: Brown to black colored board, low odor

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED): None.
AUTOIGNITION TEMPERATURE: Variable. 390-500 °F
EXPLOSION LIMITS: Wood (saw) dust: Lower: 0.035 oz/ft³
Wood dust requires 0.040 Joules/minutes of energy for ignition and can produce an explosion pressure of 113 psig max.
EXTINGUISHING MEDIA: Water, foam
UNUSUAL FIRE AND EXPLOSION HAZARDS: Wood dust is readily combustible. If saw dust is being produced from this product, it should be kept in a cool, dry place away from ignition sources. Hot, humid storage can result in spontaneous heating. Partially burned or scorched wood dust can be hazardous to store. Avoid contact with oxidizing agents and with drying oils.

SECTION V HEALTH HAZARD DATA

EFFECTS OF OVEREXPOSURE:

ACUTE: None known

CHRONIC: None known

EMERGENCY AND FIRST AID PROCEDURES:

EYES: Flush saw dust from eyes with water. If irritation persists see physician.

SKIN: Wash with soap and water.

INHALATION: Remove from exposure

INGESTION: Call physician

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0908-1735

PRODUCT: Various Wood Fiber Products

Page 2

SECTION VI REACTIVITY DATA

STABILITY: Stable

HAZARDOUS DECOMPOSITION PRODUCTS: Carbon Dioxide, Carbon Monoxide

HAZARDOUS POLYMERIZATION: Will not occur

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Pick up

WASTE DISPOSAL METHOD: In accordance with Federal, State and local regulations.

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION: Nuisance dust respirator should be worn while sawing
product

VENTILATION: Local exhaust at point of power sawing

PROTECTIVE EQUIPMENT: Safety glasses

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Keep dry.

For further technical information contact: Product Manager, Dept. 134
Wood Fiber Division
USG Industries, Inc.
101 S. Wacker Drive.
Chicago, IL 60606
312-321-5855

250P

TRW-00370

0908-1736

BOWMAN DISTRIBUTION MATERIAL SAFETY DATA SHEET

SECTION I

PRODUCT NAME CASE-DEERE GREEN ENAMEL		BOWMAN PART NO. 24719 (page 1 of 3)
SUPPLIER Bowman Distribution, Barnes Group Inc.		EMERGENCY TELEPHONE NO. (216) 381-7200
ADDRESS 850 East 72nd Street, Cleveland, OH 44103		DATE 1/26/88
HAZARDOUS MATERIAL DESCRIPTION, PROPER SHIPPING NAME, HAZARD CLASS, HAZARD ID NO. (49 CFR 172.101) Aerosol Spray Paint, Consumer Commodity, ORM-D		
ADDITIONAL HAZARD CLASSES (as applicable) N.A.		
CHEMICAL FAMILY N.A.	FORMULA X8295	

SECTION II - HAZARDOUS INGREDIENTS

CAS REGISTRY NO.	%W	%V	CHEMICAL NAME(S)	TLV PPM Mg/M ³	Listed as a Carcinogen in NTP, IARC or OSHA 1910(z) (specify)
67-64-1	30-40		Acetone	750 1750	No
1330-20-7	5-10		Xylene	100 435	No
64-17-5	5-10		Ethyl Alcohol	1000 1900	No
123-42-2	5-10		Diacetone Alcohol	50 240	No
78-93-3	5		Methyl Ethyl Ketone	200 590	No
—	23		Propellant: Propane/Isobutane	— —	No

SECTION III - PHYSICAL DATA

BOILING POINT <u>133</u> °F <u>—</u> °C		SPECIFIC GRAVITY (H ₂ O = 1)	<u>.90</u>	
VAPOR PRESSURE @ <u>—</u> °F <u>20</u> °C <input checked="" type="checkbox"/> mm Hg <input type="checkbox"/> psi		PERCENT VOLATILE BY VOLUME (%)	<u>85-90</u>	PERCENT SOLID BY WEIGHT (%) <u>15-20</u>
VAPOR DENSITY (AIR = 1)	<u>N.A.</u>	EVAPORATION RATE (= 1)	<u>N.A.</u>	
SOLUBILITY IN WATER	<u>N.A.</u>	pH =	<u>N.A.</u>	
APPEARANCE AND ODOR Paint, solvent odor.				MATERIAL IS: LIQUID

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT <u>0</u> °F <u>-18</u> °C	method used	FLAMMABLE LIMITS	LEL <u>1.1</u>	UEL <u>N.A.</u>
EXTINGUISHING MEDIA Carbon Dioxide, Dry Chemical, or Alcohol Foam				
SPECIAL FIRE FIGHTING PROCEDURES Water spray may be ineffective. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat. If water is used, fog nozzles are preferable.				
UNUSUAL FIRE AND EXPLOSION HAZARDS Vapors are heavier than air and may travel along the ground or may be moved by ventilation and ignited by pilot lights, other flames, sparks, heaters, smoking, electric motors or other ignition sources at locations distant from material handling point.				

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SECTION V - HEALTH HAZARD DATA

EFFECTS OF OVEREXPOSURE - Conditions to avoid Excessive inhalation of vapors — can cause nasal and respiratory irritation,	THRESHOLD LIMIT VALUE See Section II
dizziness, weakness, fatigue, nausea, headache, possible unconsciousness, and even asphyxiation.	PERMISSIBLE EXPOSURE LIMIT
	OTHER LIMIT
PRIMARY ROUTES OF ENTRY Inhalation <input checked="" type="checkbox"/> Skin Contact <input type="checkbox"/> Other (specify)	
EMERGENCY AND FIRST AID PROCEDURES If affected, remove individual to fresh air. If breathing is difficult, administer oxygen. If breathing has stopped, give artificial respiration. Keep person warm, quiet and get medical attention.	
SEE PAGE 3 FOR ADDITIONAL SECTION V INFORMATION	

SECTION VI - REACTIVITY DATA

STABILITY	UNSTABLE	CONDITIONS TO AVOID	
	STABLE	<input checked="" type="checkbox"/>	Heat, sparks and open flame.
INCOMPATIBILITY (materials to avoid) Avoid contact with: strong oxidizing agents and heat.			
HAZARDOUS DECOMPOSITION PRODUCTS: N.A.			
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID N.A.
	WILL NOT OCCUR	<input checked="" type="checkbox"/>	

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Absorb liquid on paper, vermiculite, floor absorbent or other absorbent material and transfer to a closed container. Eliminate all ignition sources.	
WASTE DISPOSAL METHOD Material collected on absorbent material may be deposited in a posted toxic substance landfill in accordance with local, state and federal regulations.	
CERCLA (Superfund) REPORTABLE QUANTITY (in lbs) N.A.	
RCRA HAZARDOUS WASTE NO. (40 CFR 261.33) N.A.	
VOLATILE ORGANIC COMPOUND (VOC) (as packaged, minus water)	<input checked="" type="checkbox"/> Theoretical <u>5.1</u> lb/gal
	<input type="checkbox"/> Analytical _____ lb/gal N.A. (see theoretical)

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (specify type) NIOSH/MSHA jointly approved self-contained breathing apparatus with a full face piece operated in pressure demand.		
VENTILATION	LOCAL EXHAUST (specify rate) Sufficient to maintain exposure below TLV(s).	SPECIAL
	MECHANICAL (general) (specify rate)	OTHER
PROTECTIVE GLOVES (specify type) Chemical resistant gloves.		EYE PROTECTION (specify type) Chemical splash goggles in compliance with OSHA regulations.
OTHER PROTECTIVE EQUIPMENT N.A. SEE PAGE 3 FOR ADDITIONAL SECTION VIII INFORMATION		

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING Do not store in areas above 120°F or in direct sunlight or near heat or open flames.	
OTHER PRECAUTIONS Store large quantities in buildings protected for storage of NFPA Class 1C flammable liquids.	
TRW-00372	

BOWMAN DISTRIBUTION MATERIAL SAFETY DATA SHEET

SECTION I

PRODUCT NAME CASE-DEERE GREEN ENAMEL	BOWMAN PART NO. 24719 (page 3 of 3)
SUPPLIER Bowman Distribution, Barnes Group Inc.	EMERGENCY TELEPHONE NO. (216) 391-7200
ADDRESS 850 East 72nd Street, Cleveland, OH 44103	DATE 1/26/88

SECTION V - HEALTH HAZARD DATA

ROUTES OF ENTRY	<input checked="" type="checkbox"/> Inhalation	<input type="checkbox"/> Skin	<input type="checkbox"/> Ingestion	<input checked="" type="checkbox"/> Eyes
CARCINOGENICITY	<input type="checkbox"/> NPT	<input type="checkbox"/> IARC	<input type="checkbox"/> OSHA	

Ingredients for product(s) listed in Section II are not found in these agencies' lists.

SYMPTOMS OF OVEREXPOSURE:

Acute:

BREATHING — excessive inhalation of vapors can cause nasal and respiratory irritation, dizziness, weakness, fatigue, nausea, headache, possible unconsciousness and even asphyxiation.

EYE CONTACT — can cause severe irritation, redness, tearing, blurred vision.

SWALLOWING — can cause gastrointestinal irritation, nausea, vomiting, diarrhea.

SKIN CONTACT — can cause irritation for some persons.

Chronic:

None known for product(s) in Section II.

Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage. Severe overexposure in laboratory animals has also caused heart and liver abnormalities and damage to kidneys, lungs, and spleen. Intentional misuse by deliberately concentrating and inhaling the contents may be harmful or fatal.

Medical Conditions
Generally Aggravated by Exposure:

Can cause allergic respiratory and/or skin reaction.

FIRST AID — EMERGENCY PROCEDURES:

IF BREATHED — remove individual to fresh air. If breathing is difficult, administer oxygen. If breathing is stopped, give artificial respiration and seek medical help.

IF IN EYES — flush with water for 15 minutes while occasionally holding eyelids open. Get medical attention.

IF SWALLOWED — Do not induce vomiting (aspiration of material into lungs can cause chemical pneumonitis, which can be fatal). Keep person warm, quiet, and get medical attention/Poison Control Center.

IF ON SKIN — wash with soap and water or various hand cleaners, and wash clothing before re-use.

SECTION VII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION:
For casual/occasional use — to avoid breathing vapors or spray mist, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, wear respiratory protection (NIOSH/MSHA TC23C or equivalent), or leave the area.
VENTILATION:
For regular/continuous use — provide sufficient mechanical (general) and/or local exhaust ventilation to maintain exposure below TLV's in Section II.
PROTECTIVE GLOVES:
Wear chemical resistant gloves, such as neoprene, if skin contact is to be avoided.
EYE PROTECTION:
Chemical splash goggles, in compliance with OSHA regulations, are advised.
OTHER PROTECTIVE EQUIPMENT:
Where special or unusual conditions exist, the expert assistance of an industrial hygienist should be sought.
WORK/HYGENIC PRACTICES:
Wash hands before eating or using washroom. As with all chemicals, minimize personal contact and breathing of vapors.

MATERIAL SAFETY DATA SHEET

CENTURY® CAST BRONZE

SECTION I. MATERIAL DESCRIPTION

Copper Alloy Ingots, containing Copper, Tin, Lead, Zinc, Iron, Antimony, Nickel, Aluminum, Manganese, Silicon, and Niobium.

Other Designations: ALLOYS. (See enclosed Alloy Designation Table.)

C83450	C86400	C92200	C95200
C83600	C86500	C92300	C95300
C83800	C87300	C92400	C95400
C84400	C87500	C92500	C95410
C84500	C87600	C92600	C95500
C84800	C90300	C92700	C95800
C85200	C90500	C92900	C96200
C85400	C90700	C93200	C96400
C85700	C91100	C93400	C97300
C86200	C91300	C93700	C97400
C86300	C91600	C93800	C97600
			C97800
			C99700
			C99750

SECTION II. HAZARDOUS INGREDIENTS

	FUME THRESHOLD VALUES	
	OSHA 8 HR TWA	ACGIH 8 HR TWA (TLV)
Copper	0.1 mg/m ³	0.2 mg/m ³
Tin	2 mg/m ³	2 mg/m ³
Lead	50 µg/m ³	150 µg/m ³
Zinc	5 mg/m ³	5 mg/m ³
Iron	5 mg/m ³	5 mg/m ³
Antimony	0.5 mg/m ³	0.5 mg/m ³
Nickel	1 mg/m ³	1 mg/m ³
Aluminum	10 mg/m ³	10 mg/m ³
Manganese	1 mg/m ³	1 mg/m ³
Silicon	10 mg/m ³	10 mg/m ³
Niobium	no established limit	no established limit

SECTION III. PHYSICAL DATA

Physical Form:	Solid
Boiling Point:	Not Applicable
Freeze-Melt Temperature:	Approximately 1500° - 2100°F (816° - 1149°C)
Vapor Pressure:	Not Applicable
Evaporation Rate:	Not Applicable
Specific Gravity:	7.5 - 9.0
Density:	Approximately .3 lb/inch ³
Solubility in H ₂ O:	Not Applicable
Color:	Yellow to Red
Odor:	None

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SECTION IV. FIRE AND EXPLOSION DATA

Flashpoint
Not Applicable

Auto-Ignition Temperature
Not Applicable

Flammability Limits In Air
Not Applicable

There are no fire or explosion hazards with these alloys in solid form. In case of fire use extinguishing agents appropriate for the surroundings or materials. In no case should any water be poured on the fire for fear of explosion of the molten metal if it comes in contact with water. Fire fighters should wear full protective clothing and, where conditions warrant, NIOSH approved self-contained breathing apparatus. See Sections V and VII.

SECTION V. HEALTH HAZARD DATA

The primary hazard associated with handling of these compositions is exposure to Copper, Lead and Zinc compounds when melting, pouring, cut-off, and grinding these alloys in a foundry. The work area should be carefully monitored to evaluate potential exposures to airborne metals contained in the alloys when they are handled.

SECTION VI. REACTIVITY DATA

TLV: See Section II

Primary Routes of Entry: Inhalation of dust or fumes.

Copper and Manganese: Under normal handling and use, exposure to the solid form of copper alloy presents few health hazards. Thermal cutting, melting, machining/grinding may produce fumes or dust containing the component elements and breathing these fumes or dust may present potentially significant health hazards. The exposure levels in Section II are relevant to fumes and dust. Fumes of copper and manganese may cause metal fume fever with flu-like symptoms, and copper may cause skin and hair discoloration, irritation of the upper respiratory tract, metallic taste in the mouth and nausea. Over-exposure to manganese fumes can cause chronic manganese poisoning. The central nervous system is the chief site of injury. Chronic manganese poisoning is not a fatal disease although it is extremely disabling.

Lead — Short-Term Exposure: Primary routes of entry are inhalation of dust or fumes and ingestion through contamination of hands or face. Lead is an accumulative poison. Inhalation effects of exposure to fumes or dust of inorganic lead may not develop quickly. Symptoms may include decreased physical fitness, fatigue, sleep disturbance, headache, aching bones and muscles, constipation, abdominal pains and decreasing appetite. The effects are reversible and complete recovery is possible. Inhalation of large amounts of lead may lead to seizures, coma and death.

Lead — Long-Term Exposure: Long-term exposure to lower levels can result in a buildup of lead in the body and more severe symptoms. These may include anemia, pale skin, a blue line at the gum margin, decreased hand-grasp strength, abdominal pain, severe constipation, nausea, vomiting and paralysis of the wrist joint. Prolonged exposure may also result in kidney damage. If the nervous system is affected, usually due to high exposures, the resulting effects include severe headaches, convulsions, coma, delirium, and death. In non-fatal cases, recovery is slow and not always complete. Alcohol ingestion and physical exertion may bring on symptoms.

Iron and Tin: Chronic overexposure to iron oxide or tin fumes may cause an apparent benign pneumoconiosis. In the case of iron oxide, this is called siderosis and stannosis for tin exposure.

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SECTION VI. REACTIVITY DATA (continued)

Nickel: Short-term exposure can cause lung irritation, shortness of breath, coughing and wheezing. Long-term exposure may result in impairment of sense of smell, chest pain, destruction of nasal tissue, and asthmatic lung disease. Allergic sensitivity may also develop. Nickel has been identified as a potential cancer causing agent.

Zinc: Exposure to fumes may cause "Metal Fume Fever." Onset of symptoms may be delayed 4 to 12 hours. Symptoms include irritation of the nose, mouth and throat, cough, stomach pain, headache, nausea, vomiting, metallic taste, chills, fever, pains in the muscles and joints, thirst, bronchitis or pneumonia and a bluish tint to the skin. These symptoms go away in 24 to 48 hours and leave no effect.

SECTION VII. SPILL OR LEAK PROCEDURES

Care should be taken that molten metal should be handled carefully during pouring. Since the temperature of molten copper alloys is over 2000°F, severe metal burns could occur.

SECTION VIII. SPECIAL PROTECTION INFORMATION

Melters and pourers should wear NIOSH approved respiratory protection where PEL or threshold values are or may be exceeded. The selection of the appropriate respiratory protection (dust and fume respirator, supplied-air respirator, etc.) should be based upon the actual or potential airborne contaminants and their concentrations present.

SECTION IX. SPECIAL PRECAUTIONS AND COMMENTS

All melters should wear proper protective gloves and eye protection equipment. Ingots can be preheated to remove any moisture on the surface in order to avoid any splashing when charged into a molten bath.

TRW-00376

Classification	Copper Alloy UNS No	Composition, % max except as indicated												
		Copper ^a	Tin	Lead	Zinc ^b	Iron	Antimony	Nickel (incl. Cobalt)	Sulfur	Phosphorus	Aluminum	Manganese	Silicon	Arsenic
Leaded red brass	C83450	87.0-89.0	2.2-3.0	1.5-2.5	5.8-7.5	0.25	0.25	0.8-1.5	0.08	0.03	0.005		0.005	
	C83600	84.0-86.0	4.3-6.0	4.0-5.7	4.3-6.0	0.25	0.25	0.8 ^c	0.08	0.03	0.005		0.005	
	C83800	82.0-83.5	3.5-4.2	5.8-6.8	5.5-8.0	0.25	0.25	0.8 ^c	0.08	0.02	0.005		0.005	
Leaded semi-red brass	C84200	78.0-82.0	4.3-6.0	2.0-2.8	10.0-16.0	0.35	0.25	0.8	0.08	0.02	0.005		0.005	
	C84400	79.0-82.0	2.5-3.5	6.3-7.7	7.0-10.0	0.35	0.25	0.8 ^a	0.08	0.02	0.005		0.005	
	C84800	75.0-76.7	2.3-3.0	5.5-6.7	13.0-16.0	0.35	0.25	0.8 ^c	0.08	0.02	0.005		0.005	
Leaded yellow brass	C85200	70.0-73.0	0.8-1.7	1.5-3.5	21.0-27.0	0.50	0.20	0.8	0.05	0.01	0.005		0.05	
	C85400	66.0-69.0	0.50-1.5	1.5-3.5	25.0-31.0	0.50		0.8			0.005		0.05	
	C85700	58.0-63.0	0.50-1.5	0.8-1.5	33.0-40.0	0.50		0.8			0.80		0.05	
High-strength yellow brass	C85800	57.0 min ^b	1.5	1.5	31.0-41.0	0.50	0.05	0.50	0.05	0.01	0.10	0.25	0.25	0.05
	C86200	60.0-66.0	0.10	0.10	22.0-28.0	2.0-4.0		0.8			3.0-4.0	2.5-5.0		
	C86300	60.0-66.0	0.10	0.10	22.0-28.0	2.0-4.0		0.8			5.0-7.5	2.5-5.0		
	C86400	56.0-62.0	0.50-1.0	0.50-1.3	34.0-42.0	0.40-2.0		0.8			0.50-1.5	0.10-1.0		
	C86500	55.0-60.0	1.0	0.30	36.0-42.0	0.40-2.0		0.8			0.50-1.5	0.10-1.5		
	C86700	55.0-60.0	1.5	0.50-1.5	30.0-38.0	1.0-3.0		0.8			1.0-3.0	1.0-1.5	3.5-4.5	
Silicon bronze and bismuth brass	C87300	94.0 min		0.20	0.25	0.20						0.8-1.5		
	C87400	79.0 min ^b		1.0	12.0-16.0						0.5		2.5-4.0	
	C87500	79.0 min ^b		0.50	12.0-16.0						0.5		3.0-5.0	
	C87600	88.0 min ^b		0.50	4.0-7.0	0.20						0.25	3.5-5.5	
	C87800	80.0 min ^a	0.25	0.15	12.0-16.0	0.15	0.05	0.20	0.05	0.01	0.15	0.15	3.8-4.2	0.05
	C87900	63.0 min ^b	0.25	0.25	30.0-36.0	0.40	0.05	0.50	0.05	0.01	0.15	0.15	0.8-1.2	0.05
Tin bronze and leaded tin bronze	C90300	86.0-89.0	7.8-9.0	0.25	3.5-5.0	0.15	0.20	0.8 ^a	0.05	0.03	0.005		0.005	
	C90500	86.0-89.0	9.5-10.5	0.25	1.5-3.0	0.15	0.20	0.8 ^c	0.05	0.03	0.005		0.005	
	C90700	88.0-90.0	10.3-12.0	0.50 ^d	0.50 ^d	0.15	0.10	0.50 ^d	0.05	0.30	0.005		0.005	
	C90800	85.0-89.0 ^a	11.3-13.0	0.25	0.25	0.15	0.10	0.50	0.05	0.30	0.005		0.005	
	C91000	84.0-86.0	14.3-16.0	0.20	1.5	0.10	0.10	0.8	0.05	0.03	0.005		0.005	
	C91100	82.0-85.0	15.3-17.0	0.25	0.25	0.15	0.20	0.50	0.05	1.0	0.005		0.005	
	C91300	79.0-82.0	18.3-20.0	0.25	0.25	0.15	0.20	0.50	0.05	1.0	0.005		0.005	
	C91600	86.0-89.0 ^a	10.0-10.8	0.25	0.25	0.15	0.10	1.2-2.0	0.05	0.25	0.005		0.005	
	C91700	84.0-87.0 ^a	11.5-12.5	0.25	0.25	0.15	0.10	1.2-2.0	0.05	0.30	0.005		0.005	
	C92200	86.0-89.0	5.8-6.5	1.0-1.8	3.5-5.0	0.20	0.20	0.8 ^c	0.05	0.03	0.005		0.005	
	C92300	85.0-89.0	7.8-9.0	0.30-0.9	3.0-5.0	0.20	0.20	0.8 ^c	0.05	0.03	0.005		0.005	
	C92500	85.0-88.0	10.3-12.0	1.0-1.5	0.50	0.20	0.20	0.8-1.5	0.05	0.30	0.005		0.005	
	C92700	86.0-89.0	9.3-11.0	1.0-2.3	0.8	0.15	0.20	0.8	0.05	0.30	0.005		0.005	
	C92800	78.0-82.0	15.3-17.0	4.0-5.7	0.8	0.15	0.20	0.8	0.05	0.30	0.005		0.005	
	C92900	82.0-86.0 ^a	9.3-11.0	2.0-3.0	0.25	0.15	0.10	2.8-4.0	0.05	0.50	0.005		0.005	
High-lead tin bronze	C93200	82.0-84.0	6.5-7.5	6.5-7.7	2.5-4.0	0.20	0.30	0.8 ^c	0.08	0.03	0.005		0.005	
	C93400	82.0-85.0	7.3-9.0	7.0-8.7	0.8	0.20	0.30	0.8	0.08	0.03	0.005		0.005	
	C93500	83.0-85.0	4.5-5.5	8.5-9.7	0.50-1.5	0.10	0.30	0.8	0.08	0.04	0.005		0.005	
	C93700	78.0-81.0	9.3-10.7	8.3-10.7	0.8	0.10	0.50	0.8 ^c	0.08	0.05	0.005		0.005	

Classification	Copper Alloy UNS No.	Composition, % max except as indicated													
		Copper ^a	Tin	Lead	Zinc ^b	Iron	Anti- mony	Nickel (incl Co- balt)	Sul- fur	Phos- phorus	Alumi- num	Man- ganese	Silicon	Arsenic	Magne- sium
High-lead tin bronzes <i>Continued</i>	C93800	76.0-79.0	6.5-7.5	14.0-16.0	0.8	0.10	0.50	0.8 ^c	0.08	0.05	0.005		0.005		
	C93900	76.5-79.5	5.3-7.0	14.0-17.7	1.5	0.35	0.50	0.8	0.08	0.05	0.005		0.005		
	C94000	69.0-72.0	12.3-14.0	14.0-15.7	0.50	0.25	0.50	0.50-1.0	0.08	0.05	0.005		0.005		
	C94100	72.0-79.0	4.7-6.5	15.0-21.7	3.0	0.10	0.7	0.8 ^c	0.08	0.05	0.005		0.005		
	C94300	69.0-73.0	4.7-5.8	22.0-24.5	0.8	0.10	0.7	0.8 ^c	0.08	0.05	0.005		0.005		
Nickel tin bronzes and lead nickel tin bronzes Aluminum bronzes	C94400	78.0-82.0	7.3-9.0	9.0-11.7	0.8	0.10	0.7	0.8 ^c	0.08	0.05	0.005		0.005		
	C94500	70.0-75.0	6.3-8.0	16.0-21.5	1.0	0.10	0.7	0.8 ^c	0.08	0.05	0.005		0.005		
	C94700	86.0-89.0	4.7-6.0	0.08 ^d	1.3-2.5	0.20	0.10	4.5-6.0	0.05	0.05	0.005		0.005		
	C94800	85.0-89.0	4.7-6.0	0.30-0.9	1.3-2.5	0.20	0.10	4.5-6.0	0.05	0.05	0.005		0.005		
	C94900	79.0-81.0	4.3-6.0	4.0-5.7	4.3-6.0	0.25	0.25	4.5-6.0	0.08	0.05	0.005		0.005		
	C95200	86.0 min ^f				2.5-4.0					8.5-9.5				
	C95300	86.0 min ^f				0.8-1.5					9.0-11.0				
	C95400	83.0 min ^g				3.0-5.0		1.5 max			10.0-11.5	0.5			
	C95410	83.0 min				3.0-5.0		1.5-2.5			10.0-11.5	0.5			
	C95500	78.0 min ^g				3.0-5.0		3.0-5.5			10.0-11.5	3.5			
Cupro-nickel	C95600	88.0 min ^f						0.25			6.0-8.0		1.8-3.3		
	C95700	71.0 min ^g		0.03		2.0-4.0		1.5-3.0			7.0-8.5	11.0-14.0	0.10		
	C95800	78.0 min ^g		0.02		3.5-4.5 ^e		4.0-5.0 ^e			8.5-9.5	0.8-1.5	0.05		
	C96200	84.5-87.0	0.05C	0.005	1.0Cb	1.0-1.8		9.0-11.0	0.02	0.02	0.005	0.8-1.5	0.25		
Lead nickel bronzes	C96400	65.0-67.0	0.05C	0.005	0.7-1.5Cb	0.25-1.0		29.5-31.5	0.02	0.02	0.005	0.8-1.5	0.30-0.50		
	C96800	remainder	7.5-8.5		0.1-0.3Cb			9.5-10.5				0.05-0.30			0.005-0.15
	C97300	53.0-58.0	1.5-3.0	8.0-11.0	17.0-25.0	1.0	0.35	11.0-14.0	0.08	0.05	0.005	0.5	0.05		
	C97600	63.0-66.0	3.5-4.5	3.5-5.0	3.0-9.0	1.0	0.25	19.5-21.0	0.08	0.05	0.005	1.0	0.05		
	C97800	64.0-67.0	4.5-5.5	1.0-2.0	1.0-4.0	1.0	0.20	24.0-26.0	0.08	0.05	0.005	1.0	0.05		

Date MSDS Prepared

Date: 11/1/85

By: T. DERAM

Rev.: NOV, 1985

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health AdministrationForm Approved
OMB No. 44-R11387

MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing,
Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME

BUEHLER® LTD.

EMERGENCY TELEPHONE NO.

(312) 295-6500

ADDRESS (Number, Street, City, State, and Zip Code)

41 Waukegan Road, Lake Bluff, Illinois 60044

CHEMICAL NAME AND SYNONYMS

TRADE NAME AND SYNONYMS

#30-5108/5178 CARBIMET®

CHEMICAL FAMILY

SiC Waterproof Paper

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS		N/A	BASE METAL		N/A
CATALYST		N/A	ALLOYS		N/A
VEHICLE		N/A	METALLIC COATINGS		N/A
SOLVENTS		N/A	FILLER METAL PLUS COATING OR CORE FLUX		N/A
ADDITIVES		N/A	OTHERS		N/A
OTHERS		N/A			
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV (Units)
This mixture contains no ingredients known to retain hazardous					
properties or which is defined as hazardous by OSHA.					

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	N/A	SPECIFIC GRAVITY (H ₂ O=1)	N/A
VAPOR PRESSURE (mm Hg.)	N/A	PERCENT VOLATILE BY VOLUME (%)	N/A
VAPOR DENSITY (AIR=1)	N/A	EVAPORATION RATE (_____ = 1)	N/A
SOLUBILITY IN WATER			
APPEARANCE AND ODOR			

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	N/A	FLAMMABLE LIMITS	Let	Uet
EXTINGUISHING MEDIA	Water, CO ₂ , Foam, Dry Chemical			
SPECIAL FIRE FIGHTING PROCEDURES	None			
UNUSUAL FIRE AND EXPLOSION HAZARDS	None			

TRW-00

TRW-00379

SECTION V - HEALTH HAZARD DATA	
THRESHOLD LIMIT VALUE	Nuisance dust, respirable - 5mg/m ³ , total - 15mg/m ³
EFFECTS OF OVEREXPOSURE	Choking sensation if allowed to become very dusty. May produce irritation of skin by abrasion.
EMERGENCY AND FIRST AID PROCEDURES	

SECTION VI - REACTIVITY DATA							
STABILITY	<table border="1"> <tr> <td>UNSTABLE</td> <td> </td> <td>CONDITIONS TO AVOID</td> </tr> <tr> <td>STABLE</td> <td>X</td> <td> </td> </tr> </table>	UNSTABLE		CONDITIONS TO AVOID	STABLE	X	
UNSTABLE		CONDITIONS TO AVOID					
STABLE	X						
INCOMPATIBILITY (Materials to avoid)							
HAZARDOUS DECOMPOSITION PRODUCTS							
HAZARDOUS POLYMERIZATION	<table border="1"> <tr> <td>MAY OCCUR</td> <td> </td> <td>CONDITIONS TO AVOID</td> </tr> <tr> <td>WILL NOT OCCUR</td> <td>X</td> <td> </td> </tr> </table>	MAY OCCUR		CONDITIONS TO AVOID	WILL NOT OCCUR	X	
MAY OCCUR		CONDITIONS TO AVOID					
WILL NOT OCCUR	X						

SECTION VII - SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	
No special procedures	
WASTE DISPOSAL METHOD	
No special procedures	

SECTION VIII - SPECIAL PROTECTION INFORMATION							
RESPIRATORY PROTECTION (Specify type) Avoid breathing dust							
VENTILATION	<table border="1"> <tr> <td>LOCAL EXHAUST</td> <td>Normal dust procedure</td> <td>SPECIAL</td> </tr> <tr> <td>MECHANICAL (General)</td> <td> </td> <td>OTHER</td> </tr> </table>	LOCAL EXHAUST	Normal dust procedure	SPECIAL	MECHANICAL (General)		OTHER
LOCAL EXHAUST	Normal dust procedure	SPECIAL					
MECHANICAL (General)		OTHER					
PROTECTIVE GLOVES	Recommended when grinding						
OTHER PROTECTIVE EQUIPMENT	EYE PROTECTION Face shield or safety goggles when grinding.						

SECTION IX - SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING	
Normal precautions should be taken for nuisance dusts and particulates generated during grinding operation principally from work piece.	
OTHER PRECAUTIONS	

PAGE (2) The data and information as stated was furnished by the manufacturer and supplier of this product. BUEHLER, LTD, cannot warrant the accuracy of this information, and shall not be responsible or liable for any damage that may result, should any of the information be erroneous.

Form OSHA-20
Rev. May 72

TRW-00380

0908-1746

Castrol TLC



Burmah-Castrol Inc.

RARITAN PLAZA II, RARITAN CENTER, EDISON, N.J. 08837

Telex: 219894 (CASED UR)

Telephone: (201) 225-6392

Telecopier: (201) 225-1069

December 11, 1986

T R W Control & Fasteners Group
265 3rd Street
Cambridge, MA 02142

Attn: Mr. Vincent Juliana

RECEIVED
DEC 15 1986
D. F. BORSUK

Dear Mr. Vincent:

At the request of our sales engineer, Mr. John McCormack, we are happy to provide you with technical data and material safety data sheets on CASTROL TLC-925.

Also, please be advised that we have arranged to ship you, under separate cover, a five-gallon sample of CASTROL TLC-925 for trial purposes at no charge.

Thank you for your interest in CASTROL products. We trust the enclosed information is of assistance, however, should you require any further information or help, please do not hesitate to contact either Mr. McCormack or myself.

Cordially,
BURMAH-CASTROL INC.

Robert P. Phelan/cb.

Robert P. Phelan
Manager/Metalworking Products Div.

RPP/gg
Encls.

cc: Mr. John McCormack
~~Mr. Vincent Juliana~~

TRW-00381

CASTROL
MATERIAL SAFETY DATA SHEET

SECTION 1-IDENTITY

BURMAH-CASTROL INC.

Emergency:

RARITAN PLAZA II, RARITAN CENTER Telephone No. 201-225-6392
EDISON, NEW JERSEY -08837-

Name of Person

Responsible for Preparation: MICHAEL P. SHEEHAN Date: 11/11/85

Trade Name: CASTROL TLC-925

Chemical Name: NA

Chemical Family: NEAT METALWORKING OIL

SECTION 2-HAZARDOUS INGREDIENTS

Principal Hazardous Component(s)

Chemical & Common Names

%

TLV(Units)

CAS#

NONE

SECTION 3-PHYSICAL & CHEMICAL CHARACTERISTICS

Boiling Point(F) NA

Specific Gravity(H₂O=1) 0.90

Vapor Pressure(mm Hg) NA
@25 DEG C

Percent Volatile by Volume(%) NA

Vapor Density(AIR=1) NA

Evaporation Rate NA

N-BUTYL ACETATE = 1

Solubility in Water INSOLUBLE

Appearance and Odor

SECTION 4-FIRE and EXPLOSION DATA

Flash Point (Method Used)	Flammable Limits	Lower	Upper
COC 320 DEG F	in Air %Vol.	NA	NA

Extinguishing Media FOAM, CARBON DIOXIDE AND DRY CHEMICAL.

Special Fire Fighting Procedures USE SELF CONTAINED BREATHING APPARATUS IN ENCLOSED FIRE AREAS.

Unusual Fire and Explosion Hazards NA

TRW-00382

0908-1748

CASTROL
MATERIAL SAFETY DATA SHEET

page 2

SECTION 5-PHYSICAL HAZARDS

Stability (Stable/Unstable) | Conditions NA
STABLE | to avoid

Incompatibility (Materials to Avoid) AVOID STRONG OXIDANTS.

Hazardous Decomposition Products CARBON MONOXIDE, SMOKE, HCL AND OXIDES OF SULFUR.

Hazardous Polymerization (Will/Will Not Occur) WILL NOT OCCUR

Conditions to Avoid NA

SECTION 6-HEALTH HAZARDS

Threshold Limit Value NA

Signs and Symptoms of Exposure

Acute Overexposure: PROLONGED SKIN EXPOSURE MAY CAUSE MILD SKIN IRRITATION.

Chronic Overexposure: SAME AS ABOVE.

Emergency First Aid Procedures

1. Inhalation: REMOVE FROM AREA OF VAPORS TO FRESH AIR ENVIRONMENT.

2. Eyes: FLUSH EYES WITH CLEAR WATER UNTIL IRRITATION SUBSIDES, CONTACT A PHYSICIAN.

3. Skin: REMOVE ANY CONTAMINATED CLOTHING, WASH SKIN WITH SOAP AND WATER.

4. Ingestion: DO NOT INDUCE VOMITING, CONTACT A PHYSICIAN.

SECTION 7-SPECIAL PROTECTION INFORMATION

Respiratory Protection USE HYDROCARBON VAPOR CANISTER OR AIR (specify type) SUPPLIED RESPIRATORY PROTECTION IN CONFINED AREAS.

Ventilation | Local Exhaust | Special USE ONLY WITH ADE-
| FACE VELOCITY > 60 FPM | QUATE VENTILATION.
| Mechanical (General) | Other NO SMOKING OR OPEN
| USE EXPLOSION PROOF | FLAMES.
EQUIPMENT.

Protective USE CHEMICALLY RESIST- Eye USE SPLASH GOGGLES.

Gloves ANT GLOVES, IF NEEDED TO Protection

AVIOD PROLONGED SKIN CONTACT.

Other Protective USE CHEMICAL RESISTANT APRON OR OTHER CLOTHING IF
Clothing or Equipment NEEDED TO AVIOD REPEATED OR PROLONGED SKIN
CONTACT.

CASTROL
MATERIAL SAFETY DATA SHEET

page 3

SECTION 8-SPECIAL PRECAUTIONS AND SPILL/LEAK PROCEDURES

KEEP CONTAINERS CLOSED WHEN NOT IN USE. DO
Precautions to be Taken NOT HANDLE OR STORE NEAR HEAT, SPARKS,
in Handling and Storage FLAME OR STRONG OXIDANTS. ADEQUATE
VENTILATION REQUIRED.

Other Precautions AVOID BREATHING VAPORS. AVOID PROLONGED OR
REPEATED CONTACT WITH SKIN.

Steps to be Taken in Case RECOVER FREE LIQUID. ADD ABSORBANT (SAND,
Material is Released or Spilled EARTH, SAWDUST, ETC.) TO SPILL AREA
AVOID BREATHING VAPORS. VENTILATE CONFINED SPACES. KEEP PETROLEUM
PRODUCTS OUT OF SEWERS AND WATERCOURSES BY DIKING OR IMPOUNDING.
ADVISE AUTHORITIES IF PRODUCT HAS ENTERED OR MAY ENTER SEWERS,
WATERCOURSES, OR EXTENSIVE LAND AREAS.

Waste disposal method ASSURE CONFORMITY WITH APPLICABLE REGULATIONS

DISCLAIMER

The information contained herein is believed to be accurate
and is offered in good faith. Because product use is beyond our
control, no warranty is given, expressed or implied. Burmah-Castrol
Inc. cannot assume any liability for the use of information
contained herein.

"This product contains a chlorinated paraffin."

CHLORINATED PARAFFINS ARE A CLASS OF COMPOUNDS THAT ARE SIMILARLY
MANUFACTURED BUT VARY IN MOLECULAR STRUCTURE BY CARBON CHAIN LENGTH
AND THE DEGREE OF CHLORINATION. THIS PARTICULAR PRODUCT HAS NOT BEEN
SHOWN TO HAVE ADVERSE HEALTH EFFECTS. HOWEVER THE CHLORINATED PARA-
FFINS C12/60 PERCENT CHLORINE AND C24/40 PERCENT CHLORINE IN RECENT
NATIONAL TOXICOLOGY PROGRAM BIOASSAYS CAUSE TUMORS IN LABORATORY
ANIMALS TO WHICH THOSE CHEMICALS WERE FED AT HIGH DOSES IN COMBIN-
ATION WITH CORN OIL. IN ANOTHER STUDY C14 TO 17 52 PERCENT CHLORIN-
ATED PARAFFIN WHEN FED TO PREGNANT RATS RESULTED IN DEATH OF OFF-
SPRING SOON AFTER BIRTH. THE RELEVANCE OF THESE STUDIES IF ANY,
HAS NOT BEEN DETERMINED.

TRW-00384

0908-1750



Industrial Business Group

METALWORKING PRODUCTS DIVISION

Castrol TLC-925

H.D. Cutting Oil

TLC-925 is one of the most highly compounded cutting oils in the Castrol line. It contains special additives providing active sulfur, chlorine and fat thereby enabling TLC-925 to handle the toughest metals, particularly those involving threading and tapping operations.

Castrol TLC-925 may be used as received or as a concentrate for blending cutting oils used in less severe operations.

Advantages

- Contains anti-mist additive to enhance work place safety.
- Exhibits marked improvements with respect to tool life and finish.
- Helps eliminate inventory problems.
- Handles toughest materials and operations.

**Typical
Test Data**

Specific Gravity @ 60°F	0.900
SSU @ 100°F	160
Pour Point	5°F
Lbs. per gallon	7.5
Appearance	Dark brown fluid
Flash Point	>300°F
Copper Corrosion	Positive

These are typical figures and do not constitute a specification.

TRW-00385

Note

Health and Safety information sheets are available for all Castrol lubricants and these are obtainable from the address below.

All reasonable care has been taken to ensure that the information contained in this publication is accurate as of the date of printing. However, such information may nevertheless be affected by changes occurring subsequent to the date of printing in the blend formulation or methods of application of any of the products referred to or in the requirements of any specification approval relating to any such products.

Castrol

Industrial Business Group, **Burmah-Castrol Inc.**
2698 White Road, Irvine, CA 92714 (714) 850-1151
Raritan Plaza II, Raritan Center, Edison, N.J. 08817 (201) 225-6392

TRW-00386

0908-1752

REPORT NUMBER: 703
MSDS NO: P12664V
EFFECTIVE DATE: 05/08/92

VAN WATERS & ROGERS INC.
MATERIAL SAFETY DATA SHEET

PAGE: 001
VERSION: 001

PRODUCT: CAUSTIC SODA BEADS - PELS AND PELS PLUS

ORDER NO: 112239
PROD NO: 239880

TRW FASTENERS DIVISION
195 BINNEY STREET

CAMBRIDGE, MA 02142

VAN WATERS & ROGERS INC., SUBSIDIARY OF UNIVAR (206)889-3400
6100 CARILLON POINT, KIRKLAND, WA 98033

----- EMERGENCY ASSISTANCE -----

FOR EMERGENCY ASSISTANCE INVOLVING CHEMICALS CALL - CHEMTREC
(800)424-9300

----- FOR PRODUCT AND SALES INFORMATION -----

CONTACT YOUR LOCAL VAN WATERS & ROGERS BRANCH OFFICE AT
UN&R BOSTON 508-245-0790 SALEM, MA

SECTION I PRODUCT IDENTIFICATION

PRODUCT NAME: ~~CAUSTIC SODA BEADS - PELS AND PELS PLUS~~

MSDS #: P12664V

DATE ISSUED: 04/03/91

TRADE NAME: PELS Caustic Soda Beads, PELS-Plus

CHEMICAL NAME/SYNONYMS: Anhydrous Sodium Hydroxide, Sodium Hydroxide, Caustic Soda

CHEMICAL FAMILY: Alkali

FORMULA: NaOH CAS NUMBER: 001310-73-2

U.S. DOT SHIPPING NAME: Sodium Hydroxide, Solid

U.S. DOT HAZARD CLASS: Corrosive Material

SUBSIDIARY RISK: N/A

I.D. NUMBER: UN1823

REPORTABLE QUANTITY: 1000 lbs/454 kg

IMO DESCRIPTION: Sodium Hydroxide, solid, Class 8, UN1823,

IMDG CODE PAGE: 8225.

0908-1753

TRW-00387

REPORT NUMBER: 703
MSDS NO: P12664V
EFFECTIVE DATE: 05/08/92

VAN WATERS & ROGERS INC.
MATERIAL SAFETY DATA SHEET

PAGE: 002
VERSION: 001

PRODUCT: CAUSTIC SODA BEADS - PELS AND PELS PLUS

ORDER NO: 112239
PROD NO : 239880

PHYSICAL DATA

BOILING POINT @ 760 mmHg: 1390 C
VAPOR DENSITY (AIR = 1): N/A
SPECIFIC GRAVITY (H2O = 1): 2.130
pH OF SOLUTIONS: Strongly Basic
FREEZING/MELTING POINT: 310-320 C (590-608 F)
SOLUBILITY (WEIGHT % IN WATER): 347 G/100 G water @ 100 C
BULK DENSITY: 73 #/CU. FT. (compacted)
VOLUME % VOLATILE: N/A
VAPOR PRESSURE: N/A
EVAPORATION RATE: N/A
HEAT OF SOLUTION: Exothermic
APPEARANCE AND ODOR: White to slightly colored solid, no odor

SECTION 2. INGREDIENTS

MATERIAL	PERCENT
Sodium Hydroxide	95-99

SECTION 3. FIRE/EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED): None
FLAMMABLE LIMITS IN AIR (% BY VOLUME): LEL: N/A UEL: N/A
EXTINGUISHING MEDIA: Not Applicable

UNUSUAL FIRE AND EXPLOSION HAZARDS: Contact with some metals particularly magnesium, aluminum and zinc (galvanized) can rapidly generate hydrogen, which is explosive.

SECTION 4. HEALTH HAZARD DATA

TOXICITY DATA:

LC50 INHALATION: See Section 5
LD50 DERMAL: See Section 5
SKIN/EYE IRRITATION: See Section 5
LD50 INGESTION: See Section 5
FISH, LC50 (Lethal Concentration): Unknown

TRW-00388

0908-1754

REPORT NUMBER: 703
MSDS NO: P12664V
EFFECTIVE DATE: 05/08/92

VAN WATERS & ROGERS INC.
MATERIAL SAFETY DATA SHEET

PAGE: 003
VERSION: 001

PRODUCT: CAUSTIC SODA BEADS - PELS AND PELS PLUS

ORDER NO: 112237
PROD NO : 239280

CLASSIFICATION: (POISON, IRRITANT, ETC.)

INHALATION: Irritant
SKIN: See Section 5
SKIN/EYE: Corrosive
INGESTION: Corrosive
AQUATIC: Unknown

SECTION 5. EFFECTS OF OVEREXPOSURE

This section covers effects of overexposure for inhalation, eye/skin contact, ingestion and other types of overexposure information in the order of the most hazardous and the most likely route of overexposure.

IS CHEMICAL LISTED AS A CARCINOGEN OR POTENTIAL CARCINOGEN: NTP: No; IARC: No;
OSHA: No

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: None known

PERMISSIBLE EXPOSURE LIMITS: OSHA: 2 mg/cu.m.; CEILING, 29 CFR 1910.1000
(Rev. 3/1/89).

ACUTE:

EYE CONTACT: Causes severe burns; small quantities can result in permanent damage and/or loss of vision.

SKIN CONTACT: Corrosive action causes burns and frequently deep ulceration with subsequent scarring. Prolonged contact destroys tissue. Dust or mist from solutions can cause irritant dermatitis.

INGESTION: Ingestion either in solid or liquid form can cause very serious damage to the mucous membranes or other tissues with which contact is made, and may be fatal.

INHALATION: Inhalation of dusts or mists can cause damage to the upper respiratory tract and to the lung tissue depending on severity of exposure. Effects can range from mild irritation of mucous membranes, severe pneumonitis and destruction of lung tissues.

CHRONIC: The effects of long-term, low-level exposures to this product have not been determined. Safe handling of this material on a long-term basis should emphasize the avoidance of all effects from repetitive acute exposures.

EMERGENCY AND FIRST AID PROCEDURES

TRW-00389

0908-1755

REPORT NUMBER: 703
MSDS NO: P12644V
EFFECTIVE DATE: 03/08/92

VAN WATERS & ROGERS INC.
MATERIAL SAFETY DATA SHEET

PAGE: 004
VERSION: 001

PRODUCT: CAUSTIC SODA BEADS - PELS AND PELS PLUS

ORDER NO: 112239
PROD NO : 039890

INHALATION: Remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. Contact a physician.

EYE OR SKIN CONTACT: Immediately flush eyes with plenty of water for at least 15 minutes. Hold eyelids open during this flushing with water. Call a physician.

Immediately flush skin with plenty of water while removing contaminated clothing and boots. Call a physician. If skin feels slippery, caustic may still be present in sufficient quantities to cause rash burn. Continue washing until slick skin feeling is gone. Thoroughly clean contaminated clothing and boots before reuse or discard.

INGESTION: If conscious, drink large quantities of water or acidic beverages (tomato or orange juice, carbonated soft drinks). Do not induce vomiting. Take immediately to a hospital or physician. If vomiting occurs, administer additional water. If unconscious, or in convulsions, take immediately to a hospital. Do not attempt to induce vomiting or give anything by mouth to an unconscious person.

NOTES TO PHYSICIAN (INCLUDING ANTIDOTES): Treat symptomatically.

SECTION 6. REACTIVITY DATA

STABILITY: Stable
CONDITIONS TO AVOID: Contact with material listed below
HAZARDOUS POLYMERIZATION: Will not occur.
CONDITIONS TO AVOID: None

INCOMPATIBILITY (MATERIAL TO AVOID): Organic materials and concentrated acids may cause violent reactions; caustic soda reacts with magnesium, aluminum, zinc (galvanized), tin, chromium, brass and bronze generating hydrogen which is explosive.

HAZARDOUS DECOMPOSITION PRODUCTS: Reaction with various food sugars may form carbon monoxide.

SECTION 7. SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS SPILLED OR RELEASED: Only trained personnel equipped with NIOSH/MSHA approved, full facepiece combination dust/mist and acid gas respirators should be permitted in area. For dry material, use

REPORT NUMBER: 703
MSDS NO: PL2664V
EFFECTIVE DATE: 05/08/92

VAN WATERS & ROGERS INC.
MATERIAL SAFETY DATA SHEET

PAGE: 005
VERSION: 001

PRODUCT: CAUSTIC SODA BEADS - PELS AND PELS PLUS

ORDER NO: 112239
PROD NO : 239880

appropriate methods, shovels, brooms, and vacuums to clean up the spill. If mixed with water, or likely to become mixed with water or any liquid, dike area to contain spill. Reclaim if possible. Or, dilute spill with large amounts of water then neutralize with dilute acid. Use vacuum truck to pick up neutralized material for proper disposal. Properly neutralized liquid residues (pH 6 to 9) may be disposed of in waste water treatment facilities which allow the discharge of neutral salt solutions. After all visible traces have been removed, flush area with large amounts of water.

WASTE DISPOSAL METHOD: PPG recommends disposal of dry residues in an approved hazardous waste management facility. Care must be taken when using or disposing of chemical materials and/or their containers to prevent environmental contamination. It is your duty to dispose of the chemical materials and/or their containers in accordance with the Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act, as well as any other relevant Federal, state, or local laws/regulations regarding disposal.

SECTION 8. SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION: Use NIOSH/MSHA approved dust/mist filter respirator for routine work purpose when exposure to mists exceed the permissible exposure limits. The respirator use limitation made by NIOSH/MSHA or the manufacturer must be observed. Respiratory protection programs must be in accordance with 29 CFR 1910.134.

VENTILATION (TYPE): Local exhaust sufficient to maintain dust levels below permissible exposure limit.

EYE PROTECTION: Close fitting chemical safety goggles with face shield.

GLOVES: Nitrile, neoprene, natural rubber.

OTHER PROTECTIVE EQUIPMENT: Rubber boots with safety toes, rubber aprons, PVC clothing, plastic hard hat should be used when necessary to prevent skin contact. Personal protective clothing and use of equipment must be in accordance with 29 CFR 1910.133 and 29 CFR 1910.132.

SECTION 9. SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN DURING HANDLING AND STORING: Wear NIOSH/MSHA approved, dust type respirator, where dusts or mists may be generated. Store in a dry place indoors. Never touch eyes or face with hands or gloves that may be contaminated with PELS caustic soda beads. Never enter a PELS caustic soda storage tank or container (truck or rail car) even if it appears empty. Avoid

REPORT NUMBER: 703
MSDS NO: P12664V
EFFECTIVE DATE: 05/06/92

VAN WATERS & ROGERS INC.
MATERIAL SAFETY DATA SHEET

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PRODUCT: CAUSTIC SODA BEADS - PELS AND PELS PLUS

ORDER NO: 112239
PROD NO : 239880

contact with organic materials and concentrated acids - May cause violent reactions; caustic soda reacts with magnesium, aluminum, zinc (galvanized), tin, chromium, brass and bronze, generating hydrogen which is explosive. Also, caustic soda may react with various sugars to generate carbon monoxide. When making solutions, add PELS caustic soda slowly to surface of cold water while stirring, to avoid violent eruption or explosive reaction. Do not add to warm or hot water. Hazardous carbon monoxide gas can form upon contact with food and beverage products in enclosed vessels and can cause death. Follow appropriate tank entry procedures (See ANSI Z177.1 - 1977). Keep containers closed when not in use.

OTHER PRECAUTIONS: Do not get in eyes, on skin, or on clothing. Can cause severe injury or blindness. Do not breathe mist. Do not swallow. Wash thoroughly after handling. Do not eat, drink, or smoke in work areas.

COMMENTS: TSCA - Sodium hydroxide is on the TSCA Inventory under CAS No. 1310-73-2.

SARA TITLE III - A) 311/312 CATEGORIES - Acute and reactivity, B) Not listed in Section 313, C) Not listed as an "Extremely hazardous substance" in Section 302.

CERCLA - Listed in Table 302.4 of 40 CFR Part 302 as a hazardous substance with a reportable quantity of 1000 pounds. Releases to air, land, or water which exceed the RQ must be reported to the National Response Center, 800-424-8802.

CANADIAN WHMIS - A) Sensitization to product: None known; B) Reproductive toxicity: None known; C) Odor threshold: No odor; D) Product use: Source of alkalinity; E) Requires corrosive symbol (Class E).

VAN WATERS & ROGERS INC.
MATERIAL SAFETY DATA SHEET

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PRODUCT: CAUSTIC SODA BEADS - PELS AND PELS PLUS

ORDER NO: 112239

PROD NO : 239880

FOR ADDITIONAL INFORMATION

CONTACT: MSDS COORDINATOR VW&R BOSTON
DURING BUSINESS HOURS, PACIFIC TIME (206)889-3400

07/14/92 05:15 PRODUCT: 239880 CUST NO: 176298 ORDER NO: 112239

NOTICE

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IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE,

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★ ★ ★ E N D O F M S D S ★ ★ ★

717

OCCIDENTAL CHEMICAL MATERIAL SAFETY DATA SHEET

MSDS NUMBER: M4820

MSDS DATE: 05-10-88

PRODUCT NAME: **CAUSTIC SODA-BEADS**

24 HOUR EMERGENCY PHONE: (716) 278-7021

I. PRODUCT IDENTIFICATION

3 HEALTH HAZARD, 0 FIRE HAZARD, & 2 REACTIVITY
Based on the National Paint & Coatings Association HMIS rating system.

MANUFACTURER'S:	Occidental Chemical Corporation	
NAME AND	Customer Service, Occidental Tower,	Telephone
ADDRESS	P O Box 809050, Dallas, Texas 75380	(1-800-752-5151)

CHEMICAL NAME: Sodium hydroxide CAS NUMBER: 1310-73-2

SYNONYMS/COMMON NAMES: Sodium Hydroxide-Dry

CHEMICAL FORMULA: NaOH

DOT PROPER SHIPPING NAME: Sodium Hydroxide, dry

DOT HAZARD CLASS: Corrosive material

DOT I.D. NUMBER: UN1823

HAZARDOUS SUBSTANCE: RQ1000

II. HEALTH HAZARD INFORMATION

EMERGENCY AND FIRST AID PROCEDURES

EYES:

OBJECT IS TO FLUSH MATERIAL OUT IMMEDIATELY THEN SEEK MEDICAL ATTENTION. IMMEDIATELY flush eyes with large amounts of water for at least 15 minutes, holding lids apart to ensure flushing of the entire surface. Washing eyes within several seconds is essential to achieve maximum effectiveness. SEEK MEDICAL ATTENTION IMMEDIATELY.

SKIN:

Immediately wash contaminated areas with plenty of water for at least 15 minutes. Remove contaminated clothing and footwear and wash clothing before reuse. Discard footwear which cannot be decontaminated. SEEK MEDICAL ATTENTION IMMEDIATELY.

INHALATION:

Remove to fresh air; if breathing is difficult, have trained person administer oxygen. If respiration stops, give mouth-to-mouth resuscitation. GET MEDICAL ATTENTION.

INGESTION:

NEVER give anything by mouth to an unconscious person. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. If available, give several glasses of milk. If vomiting occurs spontaneously, keep airway clear. SEEK MEDICAL ATTENTION IMMEDIATELY.

0908-1760

TRW-00394

CAS = Chemical Abstract Service Number
PEL = OSHA Permissible Exposure Limit
TLV = ACGIH Threshold Limit Value, Current
ND = No relevant information found or not available
NA = Not applicable
CORP = Corporate Exposure Limit
* = See Chronic Effects Information

IMPORTANT The information presented herein, while not guaranteed, was prepared by competent technical personnel and is true and accurate to the best of our knowledge. NO WARRANTY, OR GUARANTY, EXPRESS OR IMPLIED IS MADE REGARDING PERFORMANCE, STABILITY OR OTHERWISE. This information is not intended to be all-inclusive as to the manner and conditions of use, handling and storage. Other factors may involve other or additional safety or performance considerations. While our technical personnel will be happy to respond to questions regarding safe handling and use procedures, safe handling and use remains the responsibility of the customer. No suggestions for use are intended as, and nothing herein shall be construed as, a recommendation to infringe any existing patents or violate any Federal, State or local laws.

II. HEALTH HAZARD INFORMATION (Continued)

ROUTES OF EXPOSURE

INHALATION:

Airborne concentrations of dust, mist, or spray of this product may cause damage to the upper respiratory tract and the lung tissue which could produce chemical pneumonia depending upon severity of exposure.

SKIN:

This product is destructive to tissues contacted and produces severe burns. A latent period may exist between exposure and sense of irritation.

EYE CONTACT:

This product is destructive to eye tissues on contact. Will cause severe burns that result in damage to the eyes and even blindness.

INGESTION:

This product, if swallowed, can cause severe burns and complete tissue perforation of mucous membranes of the mouth, throat, esophagus, and stomach.

EFFECTS OF OVEREXPOSURE

ACUTE:

Corrosive to all body tissues with which it comes in contact.

CHRONIC:

The effect of chronic local dermal exposure consist of multiple areas of superficial destruction of the skin or of primary irritant dermatitis. Similarly, chronic inhalation of dust, spray, or mist may result in varying degrees of irritation or damage to the respiratory tract tissues and an increased susceptibility to respiratory illness. These effects only occur when the TLV is exceeded.

HEALTH HAZARD DATA:

Acute Oral: LD50 140-340 mg/kg (rat)
Acute Dermal: LD50 1350 mg/kg (rabbit)

Human Dermal Exposure

Regardless of concentration, the severity of damage and extent of its irreversibility increases with length of contact time. Prolonged contact with even dilute sodium hydroxide solution can cause a high degree of tissue destruction. The latent period, following skin contact during which no sensation of irritation occurs, varies from several hours for 0.4 - 4% solutions to 3 minutes with 25- 50% solutions.

III. HAZARDOUS INGREDIENTS

MATERIAL OR COMPONENT	HAZARD DATA	CAS NUMBER	%
Sodium Hydroxide	PEL= 2 mg/m3 8 hr. TWA TLV= 2 mg/m3 Ceiling	1310-73-2	100

See Section II

This material is listed in the TSCA Inventory.
Not listed as carcinogen - IARC, NTP, OSHA

IV. FIRE AND EXPLOSION DATA

FLASH POINT: NA AUTOIGNITION TEMPERATURE: Nonflammable

FLAMMABLE LIMITS IN AIR, % BY VOLUME- UPPER: NA
LOWER: NA

EXTINGUISHING MEDIA:

This product is not combustible. Water spray, foam, carbon dioxide, or dry chemical may be used in areas where the product is stored.

SPECIAL FIRE FIGHTING PROCEDURES:

Wear full protective clothing. Avoid direct contact of this product with water as this can cause violent exothermic reaction.

UNUSUAL FIRE AND EXPLOSION HAZARD:

See Reactivity (Section VII).

V. SPECIAL PROTECTION

VENTILATION REQUIREMENTS:

Special ventilation is not required under normal use. Use local exhaust ventilation where dust, mist, or spray may be generated.

NOTE: Where carbon monoxide or other reaction products may be generated, special ventilation may be required.

SPECIFIC PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY:

Respiration protection is not required under normal use. Use NIOSH/MSHA approved respirator where dust, mist, or spray may be generated.

EYE:

Wear chemical safety goggles plus full face shield to protect against splashing.

GLOVES:

Chemical Resistant gloves should be worn and may be decontaminated by washing with mild soap and water. Natural and butyl rubber have been suggested.

OTHER CLOTHING AND EQUIPMENT:

Impervious protective clothing and chemically resistant safety shoes should be worn to minimize contact. Wash contaminated clothing with soap and water and dry before reuse. Showers and eyewash facilities should be in close proximity.

MONITORING EXPOSURE

BIOLOGICAL:

N/A

PERSONAL/AREA:

NIOSH Analytical Method No. 7401.

VI. PHYSICAL DATA

BOILING POINT @ 760 mm Hg: 1388°C

FREEZING POINT: 318°C

VAPOR PRESSURE: 42 mm Hg @ 1000°C

SPECIFIC GRAVITY (H₂O=1): 2.13 @ 20°C

SOLUBILITY IN H₂O % BY WT: Completely Soluble

VAPOR DENSITY (Air=1): NA

APPEARANCE AND ODOR: Clear white solid with no distinct odor.

pH: 0.01 moles/liter has pH. 12.0

VII. REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY:

Under normal conditions of use, this material is stable.

INCOMPATIBILITY:

See Section VIII. Avoid contact with water. This product may be added slowly to water or acids with dilution and constant stirring to avoid a violent exothermic reaction. When handling this product, avoid contact with aluminum, tin, zinc, and alloys containing these metals. Do not mix with strong acids without dilution and agitation to prevent violent or explosive reaction. Avoid contact with leather, wool, acids, organic halogen compounds, and organic nitro compounds.

HAZARDOUS DECOMPOSITION PRODUCTS:

None known.

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION:

Not known to polymerize.

VIII. HANDLING AND STORAGE

HANDLING AND STORAGE PRECAUTIONS:

Do not get into eyes, on skin, on clothing.
Avoid breathing dust, mists, or spray.
Do not take internally.
Use with adequate ventilation and employ respiratory protection when exposure to dust, mist or spray is possible.
When handling, wear chemical splash goggles, face shield, rubber gloves and protective clothing.
Wash thoroughly after handling or contact - exposure can cause burns which are not immediately painful or visible.
Keep container closed.
Product can react violently with water, acids, and other substances - read Special Mixing and Handling Instructions below carefully before using.
Product is corrosive to tin, aluminum, zinc and alloys containing these metals, and will react violently with these metals in powder form.
Hazardous carbon monoxide gas can form upon contact with food and beverage products in enclosed spaces and can cause death. Follow appropriate tank entry procedures (ANSI Z117.1-1977).

SPECIAL MIXING AND HANDLING INSTRUCTIONS:

Product can react violently with water. Considerable heat is generated when product is mixed with water. Therefore, when making solutions always carefully follow these steps:

ALWAYS wear ALL protective clothing described above. NEVER add water to product. ALWAYS add product - with constant stirring - slowly to surface of lukewarm (80-100°F) water, to assure product is being completely dissolved as it is added.

If product is added too rapidly, or without stirring, and becomes concentrated at bottom of mixing vessel, excessive heat may be generated, resulting in DANGEROUS boiling and spattering, and a possible IMMEDIATE AND VIOLENT ERUPTION of highly caustic solution.

NOTE: 50 pounds of product dissolved in 30 gallons of 90°F water will raise temperature of resulting solution to approximately 180°F. Never add more product than can be absorbed by solution while maintaining temperature below 200°F (@ sea level) to prevent boiling and spattering.

Product can react EXPLOSIVELY with acids, aldehydes, and many other organic chemicals - when mixing product with solutions containing such chemicals, follow all of above mixing instructions, and add product very gradually, while stirring constantly.

ALWAYS empty and clean containers of all residues before adding product, to avoid possible EXPLOSIVE reaction between product and unknown residue.

Returnable containers should be shipped in accordance with supplier's recommendations. Return shipments should comply with all federal, state, and DOT regulations. All residual caustic soda should be removed from containers prior to disposal.

IX. ENVIRONMENTAL PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:

Leaks should be stopped. Spills should be contained and cleaned up immediately. Liquid spills should be removed by using a vacuum truck. Solid spills should be scooped up and placed in approved containers for disposal. Neutralize remaining traces of material with any dilute inorganic acid such as hydrochloric, sulfuric, nitric, phosphoric or acetic acid. The spill area should then be flushed with water followed by liberal covering of sodium bicarbonate. All clean-up material should be removed and placed in approved containers, labeled and stored in a safe place to await proper treatment or disposal. Spills on areas other than pavement, e.g., dirt or sand, may be handled by removing the affected soils and placing in approved containers. Persons performing clean-up work should wear adequate personal protective equipment and clothing. Spills or releases should be reported, if required, to the appropriate local, state and federal regulatory agencies.

CAUTION: Caustic Soda may react violently with acids and water.

WASTE DISPOSAL METHOD:

The materials resulting from clean-up operations may be hazardous waste and, therefore, subject to specific regulations. Package, store, transport, and dispose of all clean-up materials and any contaminated equipment in accordance with all applicable federal, state, and local health environmental regulation. Shipments of waste materials are subject to manifesting requirements per applicable regulations. Appropriate disposal will depend on the nature of each waste material and should be performed by competent and properly permitted contractors. Ensure that all responsible federal, state, and local agencies receive proper notification of spill and disposal methods.

X. ADDITIONAL INFORMATION

OSHA Standard 29CFR 1910.1200 requires that information be provided employees regarding the hazards of chemicals by means of a hazard communication program including labeling, material safety data sheets, training and access to written records.

Note: For additional Non-Emergency health, safety, or environmental information, telephone (716) 286-3081.

For Emergencies: 24 HOUR EMERGENCY PHONE: (716) 278-7021

WARNING LABEL INFORMATION

SIGNAL WORD: DANGER!

STATEMENT OF HAZARDS:

CAUSES SEVERE BURNS TO SKIN, EYES AND MUCOUS MEMBRANES
CONTACT WITH EYES CAN CAUSE PERMANENT EYE DAMAGE
INHALATION OF DUST, MIST, OR SPRAY CAN CAUSE SEVERE LUNG DAMAGE
CAN REACT VIOLENTLY WITH WATER, ACIDS, AND OTHER SUBSTANCES

PRECAUTIONARY STATEMENTS:

Do not get into eyes, on skin, on clothing.
Avoid breathing dust, mist, or spray.
Do not take internally.
Use with adequate ventilation and employ respiratory protection when exposure to dust, mist or spray is possible.
When handling, wear chemical splash goggles, face shield, rubber gloves, and protective clothing.
Wash thoroughly after handling or contact - exposure can cause burns which are not immediately painful or visible.
Keep container closed.
Product can react violently with water, acids, and other substances - read Handling and Storage instructions below carefully before using.
Product is corrosive to tin, aluminum, zinc and alloys containing these metals, and will react violently with these metals in powder form.
Hazardous carbon monoxide gas can form upon contact with food and beverage products in enclosed spaces and can cause death. Follow appropriate tank entry procedures (ANSI Z114.1-1977).

FIRST AID:

IN CASE OF CONTACT:

FOR EYES:

IMMEDIATELY flush with plenty of water for at least 15 minutes, holding eyelids apart to ensure flushing of the entire eye surface. Washing eyes within several seconds is essential to achieve maximum effectiveness. SEEK MEDICAL ATTENTION IMMEDIATELY.

FOR SKIN:

IMMEDIATELY wash with plenty of water for 15 minutes. Remove contaminated clothing and footwear. Wash clothing before reuse and discard footwear which cannot be decontaminated. SEEK MEDICAL ATTENTION IMMEDIATELY.

IF INHALED:

Remove to fresh air. If breathing is difficult, have trained person administer oxygen. If respiration stops, give mouth-to-mouth resuscitation. GET MEDICAL ATTENTION.

IF SWALLOWED:

DO NOT induce vomiting. Give large quantities of water. If available, give several glasses of milk. Never give anything by mouth to an unconscious person. SEEK MEDICAL ATTENTION IMMEDIATELY.

IN CASE OF:

SPILL OR LEAK:

Leaks should be stopped. Spills, after containment, should be shoveled up or removed by vacuum truck (if liquid) to chemical waste area. Neutralize residue with dilute acid, flush spill area with water followed by liberal covering of sodium bicarbonate. Dispose of wash water and spill by-products according to federal, state, and local regulations.

WARNING LABEL INFORMATION (Continued)

HANDLING AND STORAGE:

Considerable heat is generated when product is mixed with water. Therefore, when making solutions always carefully follow these steps:

ALWAYS wear ALL protective clothing described above. NEVER add water to product. ALWAYS add product - with constant stirring - slowly to surface of lukewarm (80-100°F) water, to assure product is being completely dissolved as it is added.

If product is added too rapidly, or without stirring, and becomes concentrated at bottom of mixing vessel, excessive heat may be generated, resulting in DANGEROUS boiling and spattering, and a possible IMMEDIATE AND VIOLENT ERUPTION of highly caustic solution.

NOTE: 50 pounds of product dissolved in 30 gallons of 90°F water will raise temperature of resulting solution to approximately 180°F. Never add more product than can be absorbed by solution while maintaining temperature below 200°F (@ sea level) to prevent boiling and spattering.

Product can react EXPLOSIVELY with acids, aldehydes, and many other organic chemicals - when mixing product with solutions containing such chemicals, follow all of above mixing instructions, and add product very gradually, while stirring constantly.

ALWAYS empty and clean containers of all residues before adding product, to avoid possible EXPLOSIVE reaction between product and unknown residue.

Returnable containers should be shipped in accordance with supplier's recommendations. Return shipments should comply with all federal, state, and DOT regulations. All residual caustic soda should be removed from containers prior to disposal.

DISPOSAL

The materials resulting from clean-up operations may be hazardous wastes and, therefore, subject to specific regulations. Package, store transport, and dispose of all clean-up materials and any contaminated equipment in accordance with all applicable federal, state, and local health environmental regulations. Shipments of waste materials may be subject to manifesting requirements per applicable regulations. Appropriate disposal will depend on the nature of each waste material and should be performed by competent and properly permitted contractors. Ensure that all responsible federal, state, and local agencies receive proper notification of disposal.

HMIS RATING SYSTEM: HEALTH 3 FLAMMABILITY 0 REACTIVITY 2

FOR INDUSTRIAL USE ONLY

LABEL 078M4820

717

MATERIAL SAFETY DATA SHEET

Dow Chemical ~~U.S.A.~~* Midland, MI 48674 Emergency Phone: 517-636-4400

Product Code: 15325

Page: 1

PRODUCT NAME: CAUSTIC SODA BEADS TECHNICAL GRADE

Effective Date: 12/21/88 Date Printed: 02/23/89

MSDS:000100

1. INGREDIENTS: (% w/w, unless otherwise noted)

Sodium hydroxide (NaOH)	CAS# 001310-73-2	>98.5%
Sodium carbonate (Na ₂ CO ₃)	CAS# 000497-19-8	< 0.65%
Sodium chloride (NaCl)	CAS# 007647-14-5	< 0.6%
Sodium sulfate (Na ₂ SO ₄)	CAS# 007757-82-6	< 0.12%

This document is prepared pursuant to the OSHA Hazard Communication Standard (29 CFR 1910.1200). In addition, other substances not 'Hazardous' per this OSHA Standard may be listed. Where proprietary ingredient shows, the identity may be made available as provided in this standard.

2. PHYSICAL DATA:

BOILING POINT: 1390C
VAP PRESS: Not applicable
VAP DENSITY: Not applicable
SOL. IN WATER: 109 gm/100 gm @ 20C
SP. GRAVITY: 70 lbs/cu ft
MELTING POINT: 604F, 318C.
APPEARANCE: White solid.
ODOR: No odor.

3. FIRE AND EXPLOSION HAZARD DATA:

FLASH POINT: Not applicable
METHOD USED: Not applicable

FLAMMABLE LIMITS
LFL: Not applicable
UFL: Not applicable

EXTINGUISHING MEDIA: Non-combustible.

FIRE & EXPLOSION HAZARDS: In water solution caustic can react

(Continued on Page 2)

(R) Indicates a Trademark of The Dow Chemical Company

* An Operating Unit of The Dow Chemical Company

MATERIAL SAFETY DATA SHEET

Dow Chemical U.S.A.* Midland, MI 48674 Emergency Phone: 517-636-4400

Product Code: 15325

Page: 2

PRODUCT NAME: CAUSTIC SODA BEADS TECHNICAL GRADE

Effective Date: 12/21/88 Date Printed: 02/23/89

MSDS:000100

3. FIRE AND EXPLOSION HAZARD DATA: (CONTINUED)

with amphoteric metals (such as aluminum) generating hydrogen which is flammable and/or explosive if ignited.

FIRE-FIGHTING EQUIPMENT: Not available.

4. REACTIVITY DATA:

STABILITY: (CONDITIONS TO AVOID) Product absorbs water and carbon dioxide from the air. Keep containers closed and sealed.

INCOMPATIBILITY: Water and acid. Product is strong caustic

alkali. May react violently with water, acid, and a number of organic compounds. Caustic reacts rapidly with aluminum, tin, and zinc. It will also react with bronze and brass.

HAZARDOUS DECOMPOSITION PRODUCTS: None.

HAZARDOUS POLYMERIZATION: Will not occur.

5. ENVIRONMENTAL AND DISPOSAL INFORMATION:

ACTION TO TAKE FOR SPILLS/LEAKS: Only trained and properly protected personnel should be involved in spill cleanup operations. Acting cautiously, accidental spills of caustic soda beads must first be shoveled up. Then carefully, flush the spill area with water. Dilute acid, preferably acetic acid, may be used to neutralize only the final traces of caustic after flushing.

DISPOSAL METHOD: Disposal of caustic soda must meet all federal, state, and local regulations. Contact The Dow Chemical Company for additional information.

(Continued on Page 3)

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M A T E R I A L S A F E T Y D A T A S H E E T

Dow Chemical U.S.A.* Midland, MI 48674 Emergency Phone: 517-636-4400

Product Code: 15325

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PRODUCT NAME: CAUSTIC SODA BEADS TECHNICAL GRADE

Effective Date: 12/21/88 Date Printed: 02/23/89

MSDS:000100

6. HEALTH HAZARD DATA:

EYE: May cause severe irritation with corneal injury and result in permanent impairment of vision, even blindness. Dusts may irritate eyes.

SKIN CONTACT: Short single exposure may cause severe skin burns.

SKIN ABSORPTION: A single prolonged skin exposure is not likely to result in absorption of harmful amounts. The dermal LD50 has not been determined.

INGESTION: May cause gastrointestinal irritation or ulceration, and severe burns of the mouth and throat. Single dose oral LD50 has not been determined.

INHALATION: Dusts or mists may cause severe irritation to upper respiratory tract.

SYSTEMIC & OTHER EFFECTS: No systemic effects are expected.

7. FIRST AID:

EYES: Wash eyes immediately and continuously until assistance arrives for transport to medical facility; wash enroute, if possible. If medical assistance is not immediately available, wash for 30 minutes and seek medical attention immediately.

SKIN: Immediate continued and thorough washing in flowing water for 30 minutes is imperative while removing contaminated clothing. Prompt medical consultation is essential. Wash contaminated clothing before reuse. Destroy contaminated shoes.

INGESTION: Do not induce vomiting. Give large amounts of water or milk if available and transport to medical facility.

INHALATION: Remove to fresh air if effects occur. Consult medical.

(Continued on Page 4)

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MATERIAL SAFETY DATA SHEET

Dow Chemical U.S.A.* Midland, MI 48674 Emergency Phone: 517-636-4400

Product Code: 15325

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PRODUCT NAME: CAUSTIC SODA BEADS TECHNICAL GRADE

Effective Date: 12/21/88 Date Printed: 02/23/89

MSDS:000100

7. FIRST AID: (CONTINUED)

NOTE TO PHYSICIAN: Corrosive. May cause stricture. If lavage is performed, suggest endotracheal and/or esophagosopic control. Material is strong alkali. If burn is present, treat as any thermal burn, after decontamination. Eye irrigation may be necessary for an extended period of time to remove as much caustic as possible. Duration of irrigation and treatment is at the discretion of medical personnel. No specific antidote. Supportive care. Treatment based on judgment of the physician in response to reactions of the patient.

8. HANDLING PRECAUTIONS:

EXPOSURE GUIDELINE(S): Sodium hydroxide: ACGIH TLV is 2 mg/m³ ceiling; OSHA PEL is 2 mg/m³ (TWA).

VENTILATION: Control airborne concentrations below the exposure guideline. Local exhaust ventilation may be necessary for some operations.

RESPIRATORY PROTECTION: When airborne exposure guidelines and/or comfort levels may be exceeded, use an approved air-purifying respirator.

SKIN PROTECTION: Use protective clothing impervious to this material. Selection of specific items such as gloves, boots, apron, hard hat with face-shield or full-body suit will depend on operation. Safety shower should be located in immediate work area. Remove contaminated clothing immediately, wash skin area with soap and water, and launder clothing before reuse. Contaminated leather items, such as shoes, belts, and watchbands, should be removed and destroyed.

EYE PROTECTION: Use chemical goggles. Wear a face-shield which allows use of chemical goggles, or wear a full-face respirator, to protect face and eyes when there is any likelihood of splashes. Eye wash fountain should be located in immediate work area.

(Continued on Page 5)

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MATERIAL SAFETY DATA SHEET

Dow Chemical U.S.A.* Midland, MI 48674 Emergency Phone: 517-636-4400

Product Code: 15325

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PRODUCT NAME: CAUSTIC SODA BEADS TECHNICAL GRADE

Effective Date: 12/21/88 Date Printed: 02/23/89

MSDS:000100

9. ADDITIONAL INFORMATION:

REGULATORY REQUIREMENTS:

SARA HAZARD CATEGORY: This product has been reviewed according to the EPA 'Hazard Categories' promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

An immediate health hazard

SPECIAL PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Prevent eye and skin contact. Do not breathe dusts or mists.

Avoid storing next to strong acids. Caustic should be stored in clean, dry areas. Do not store in underground tanks. Product absorbs water and CO₂ from air. Keep containers closed and sealed.

Special precautions for dissolving beads:

1. Always add beads to the liquid. Never add the liquid to the beads.
2. The liquid should be lukewarm (80-100F). Never start with hot or cold liquid.
3. Always sprinkle the beads slowly over the surface of the constantly stirred liquid.

The addition of caustic soda to liquid will cause a rise in

temperature. If caustic soda becomes concentrated in one area, or is added too rapidly, or is added to hot or cold liquid, a rapid temperature increase can result in dangerous mists or boiling or spattering which may cause an immediate violent eruption.

MSDS STATUS: Revised Section 9

SARA 313 INFORMATION:

This product contains the following substances subject to the

(Continued on Page 6)

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M A T E R I A L S A F E T Y D A T A S H E E T

Dow Chemical U.S.A.* Midland, MI 48674 Emergency Phone: 517-636-4400

Product Code: 15325

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PRODUCT NAME: CAUSTIC SODA BEADS TECHNICAL GRADE

Effective Date: 12/21/88 Date Printed: 02/23/89

MSDS:000100

9. ADDITIONAL INFORMATION: (CONTINUED)

reporting requirements of section 313 of Title III of the
Superfund Amendments and Reauthorization Act of 1986 and
40 CFR Part 372:

CHEMICAL NAME	CAS NUMBER	CONCENTRATION
SODIUM HYDROXIDE (SOLUTION)	001310-73-2	98.5 %

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The Information Herein is Given in Good Faith, But No Warranty,
Express Or Implied, is Made. Consult The Dow Chemical Company
For Further Information.

* An Operating Unit of The Dow Chemical Company

TRW-00407

0908-1773



Occidental Chemical Corporation

Data Sheet

Electrochemicals Division

1158

50% Caustic Soda – Diaphragm Sales Specification

COMPONENT	BASIS	SALES SPECIFICATION	
Total Alkalinity (as Na ₂ O)	Wt. %	38.7	Min.
Hydroxide Alkalinity (as NaOH)	Wt. %	50.	Min.
Na ₂ CO ₃	Wt. %	0.15	Max.
NaCl	Wt. %	1.10	Max.
NaClO ₃	Wt. %	0.12	Max.
Na ₂ SO ₄	ppm by wt.	400.	Max.
Fe	ppm by wt.	9.	Max.
Cu	ppm by wt.	0.2	Max.
Ni	ppm by wt.	2.	Max.
Hg	ppm by wt.	0.01	Max.
Heavy Metals (as Pb)	ppm by wt.	15.	Max.
As	ppm by wt.	1.5	Max.

TRW-00408

0908-1774

Occidental Chemical Corporation

Electrochemicals Division

Occidental Tower

3005 LBJ Freeway

Dallas, Texas 75244

214 / 404-3300

IMPORTANT: The information presented herein, while not guaranteed, was prepared by technical personnel and is true and accurate to the best of our knowledge. No warranty or guarantee, express or implied, is made regarding performance, stability or otherwise. This information is not intended to be all-inclusive as the manner and conditions of use, handling, storage and other factors may involve other or additional safety or performance considerations. While our technical personnel will be happy to respond to questions regarding safe handling and use procedures, safe handling and use remains the responsibility of the customer. No suggestions for use are intended as, and nothing herein shall be construed as, a recommendation to infringe any existing patents or to violate any Federal, State or local laws.



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GEORGE MANN & CO., INC.
MERCHANTS AND DISTRIBUTORS OF INDUSTRIAL CHEMICALS

P.O. BOX 9066 • PROVIDENCE, RHODE ISLAND 02940

MAIN OFFICE AND PLANT
HARBORSIDE BOULEVARD - MUNICIPAL DOCK
TELEPHONE 401 781-5600

BRANCH OFFICE AND PLANT
P.O. BOX 231
105 CENTRAL STREET - STONEHAM, MASS. 02180
TELEPHONE 617 438-1335

TRW FASTENERS DIVISION
265 THIRD ST.
CAMBRIDGE, MA

02142

SUBJECT: MATERIAL SAFETY DATA SHEET

Gentlemen,

OXYCHEM

our supplier of

~~50% CHLOROPOLYESTER DIAPHRAGM~~

has revised their Material Safety Data Sheet. A copy of the new sheet is enclosed.

Please review this information with those responsible for the safe handling of this product.

Very truly yours,

GEORGE MANN & COMPANY

Stephen H. Monica

Stephen H. Monica
Purchasing Manager

SEM/hc

Enclosure

TRW-00409

0908-1775



MATERIAL SAFETY DATA SHEET

ISDS NUMBER : M4806
MSDS DATE : 01-19-90
PRODUCT NAME : 50% CAUSTIC SODA-DIAPHRAGM

24 HOUR EMERGENCY PHONE: (716) 278-7021

I. PRODUCT IDENTIFICATION

HMIS HAZARD RATINGS

HEALTH HAZARD 3 FIRE HAZARD 0 REACTIVITY 2
Based on the National Paint & Coatings Association HMIS rating system.

SARA/TITLE III HAZARD CATEGORIES (See Section X)

Immediate (ACUTE) Health: YES Reactive Hazard: YES
Delayed (Chronic) Health: NO Sudden Release of Pressure: NO
Fire Hazard: NO

MANUFACTURER'S: Occidental Chemical Corporation
NAME AND : Customer Service, Occidental Tower, Telephone
ADDRESS : P O Box 809050, Dallas, Texas 75380 (1-800-752-5151)

CHEMICAL NAME: Sodium Hydroxide CAS NUMBER: 1310-73-2

SYNONYMS/COMMON NAMES: Sodium Hydroxide; NaOH

CHEMICAL FORMULA: NaOH

DOT PROPER SHIPPING NAME: Sodium Hydroxide, Liquid

DOT HAZARD CLASS: Corrosive Material

DOT I.D. NUMBER: UN1824

DOT HAZARDOUS SUBSTANCE: RQ 1000#

II. HEALTH HAZARD INFORMATION

EMERGENCY AND FIRST AID PROCEDURES

EYES:

OBJECT IS TO FLUSH MATERIAL OUT IMMEDIATELY THEN SEEK MEDICAL ATTENTION. IMMEDIATELY flush eyes with large amounts of water for at least 15 minutes forcibly holding lids apart to ensure flushing of entire surface. Washing eyes within several seconds is essential to achieve maximum effectiveness. SEEK MEDICAL ATTENTION IMMEDIATELY.

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TRW-00410

CAS : Chemical Abstract Service Number
PEL : OSHA Permissible Exposure Limit
TLV : ACGIH Threshold Limit Value, Current
NO : No relevant information found or not available
CORP : Corporate Exposure Limit
NA : Not applicable
See Chronic Effects Information
IMPORTANT: The information presented herein, while not guaranteed, was prepared by competent technical personnel and is true and accurate to the best of our knowledge. NO WARRANTY, OR GUARANTY, EXPRESS OR IMPLIED IS MADE REGARDING PERFORMANCE, STABILITY, OR OTHERWISE. This information is not intended to be all-inclusive as to the manner and conditions of use, handling and storage. Other factors may involve other or additional safety or performance considerations. While our technical personnel will be happy to respond to questions regarding safe handling and use procedures, safe handling and use remains the responsibility of the customer. No suggestions for use are intended as, and nothing herein shall be construed as a recommendation to infringe any existing patents or violate any Federal, State or local laws.

NAME: 50% CAUSTIC SODA-DIAPHRAGM

II. HEALTH HAZARD INFORMATION (Continued)

SKIN:

IMMEDIATELY wash with plenty of water for at least 15 minutes. Remove contaminated clothing and footwear. Wash clothing before reuse and discard footwear which cannot be decontaminated. SEEK MEDICAL ATTENTION IMMEDIATELY.

INHALATION:

Remove to fresh air; if breathing is difficult have trained person administer oxygen. If respiration stops, give mouth-to-mouth resuscitation. GET MEDICAL ATTENTION.

INGESTION:

NEVER give anything by mouth to an unconscious person. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. If available, give several glasses of milk. If vomiting occurs spontaneously, keep airway clear. SEEK MEDICAL ATTENTION IMMEDIATELY.

ROUTES OF EXPOSURE

INHALATION:

Airborne concentrations of dust, mist, or spray of this product may cause damage to the upper respiratory tract and lung tissue proper which could produce chemical pneumonia, depending upon severity of exposure.

SKIN:

This product is destructive to tissue contacted and produces severe burns. A latent period may exist between exposure and sense of irritation.

EYE CONTACT:

This product is destructive to eye tissues on contact. Will cause severe burns that result in damage to the eyes and even blindness.

INGESTION:

This product, if swallowed, can cause severe burns and complete tissue perforation of mucous membranes of the mouth, throat, esophagus, and stomach.

EFFECTS OF OVEREXPOSURE

ACUTE:

Corrosive to all body tissues with which it comes in contact. The effect of local dermal exposure may consist of multiple areas of superficial destruction of the skin or of primary irritant dermatitis. Similarly, inhalation of dust, spray, or mist may result in varying degrees of irritation or damage to the respiratory tract tissues and an increased susceptibility to respiratory illness. These effects occur only when the TLV is exceeded.

CHRONIC:

No known chronic effects.

TOXICOLOGY DATA:

Caustic soda is a corrosive material.
Acute Oral LD50 = 140-340 mg/kg (rat)
Acute Oral LD50 = 1350 mg/kg (rabbit)

Human Dermal Exposure

Regardless of concentrations, the severity of damage and extent of its irreversibility increases with length of contact time. Prolonged contact with even dilute sodium hydroxide solution can cause a high degree of tissue destruction. The latent period, following skin contact during which no sensation of irritation occurs, varies from several hours for 0.4 - 4% solution to 3 minutes with 25 - 50% solution.

TRW-00411

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III. IMPORTANT COMPONENTS

CAS NUMBER / NAME

1310732 Sodium hydroxide (Na(OH))

EXPOSURE LIMITS

PEL=2 mg/m3, Ceiling
TLV=2 mg/m3, Ceiling

PERCENTAGE

VOL 31.90
WT 50

COMMON NAMES:

CAUSTIC SODA

Listed On(List Legend Below):

13 18 21

7732185 Water

EXPOSURE LIMITS

PEL=Not Established
TLV=Not Established

PERCENTAGE

VOL 68.10
WT 50

COMMON NAMES:

Listed On(List Legend Below):

19

See Section II

All components of this product that are required to be on the TSCA Inventory are listed on the inventory.

Not listed as carcinogen - IARC, NTP, OSHA

LIST LEGEND

13 PA ENVIRONMENTAL HAZ SUBSTANCE
19 PA REQUIREMENT- 3% OR GREATER

18 NY HAZARDOUS SUBSTANCES
21 NJ SPECIAL HEALTH HAZ SUB

IV. FIRE AND EXPLOSION DATA

FLASH POINT: NA

AUTOIGNITION TEMPERATURE: Nonflammable

FLAMMABLE LIMITS IN AIR, % BY VOLUME- UPPER: NA
LOWER: NA

EXTINGUISHING MEDIA:

This product is not combustible. Water spray, foam, carbon dioxide or dry chemical may be used where this product is stored.

SPECIAL FIRE FIGHTING PROCEDURES:

Wear full protective clothing. Avoid direct contact of this product with water as this can cause a violent exothermic reaction.

UNUSUAL FIRE AND EXPLOSION HAZARD:

None. See Reactivity (Section VII).

PRODUCT NAME: 50% CAUSTIC SODA-DIAPHRAGM

V. SPECIAL PROTECTION

VENTILATION REQUIREMENTS:

Special ventilation is not required under normal use. Use local exhaust ventilation where dust, mist, or spray may be generated. NOTE: Where carbon monoxide or other reaction products may be generated, special ventilation may be required.

RESPIRATORY:

SPECIFIC PERSONAL PROTECTIVE EQUIPMENT

Respiratory protection is not required under normal use. Use NIOSH/MSHA approved respirators where dust, mist, or spray may be generated.

EYE:

Wear chemical safety goggles plus full face shield to protect against splashing.

GLOVES:

Chemical resistant gloves should be worn. Gloves may be decontaminated by washing with mild soap and water. Natural and butyl rubber have been suggested.

OTHER CLOTHING AND EQUIPMENT:

Impervious protective clothing and chemically resistant safety shoes should be worn to minimize contact. Wash contaminated clothing with soap and water and dry before reuse. Showers and eyewash facilities should be accessible.

BIOLOGICAL:

NA

MONITORING EXPOSURE

PERSONAL/AREA:

Use NIOSH Analytical Method No. 7401.

VI. PHYSICAL DATA

BOILING POINT @ 760 mm Hg: 143°C (289°F)

FREEZING POINT: 12.1°C (54°F)

VAPOR PRESSURE: 13 mm Hg @ 60°C

SPECIFIC GRAVITY (H₂O=1): 1.54 @ 15.6°C

SOLUBILITY IN H₂O % BY WT: Completely soluble

VAPOR DENSITY (Air=1): NA

APPEARANCE AND ODOR: Clear liquid with no distinct odor.

pH: 7.5% solution has pH 14.0

DENSITY: 12.8 lb/gal

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VII. REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY:

Under normal conditions, this product is stable.

INCOMPATIBILITY:

See Handling and Storage (Section VIII). Avoid direct contact with water. This product may be added slowly to water or acids with dilution and agitation to avoid a violent exothermic reaction. When handling this product, avoid contact with aluminum, tin, zinc, and alloys containing these metals. Do not mix with strong acids without dilution and agitation to prevent violent or explosive reaction. Avoid contact with leather, wool, acids, organic halogen compounds and organic nitro compounds.

HAZARDOUS DECOMPOSITION PRODUCTS:

None known.

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION:

Material is not known to polymerize.

VIII. HANDLING AND STORAGE

HANDLING AND STORAGE PRECAUTIONS:

- Do not get into eyes, on skin, on clothing.
- Avoid breathing dust, mists, or spray.
- Do not take internally.
- Use with adequate ventilation and employ respiratory protection when exposure to dust, mist or spray is possible.
- When handling, wear chemical splash goggles, face shield, rubber gloves and protective clothing.
- Wash thoroughly after handling or contact - exposure can cause burns which are not immediately painful or visible.
- Keep container closed.
- Product can react violently with water, acids, and other substances - read Special Mixing and Handling Instructions below carefully before using.
- Product is corrosive to tin, aluminum, zinc and alloys containing these metals, and will react violently with these metals in powder form.
- Hazardous carbon monoxide gas can form upon contact with food and beverage products in enclosed spaces and can cause death. Follow appropriate tank entry procedures (ANSI Z117.1-1977).

SPECIAL MIXING AND HANDLING INSTRUCTIONS

Product can react violently with water. Considerable heat is generated when product is mixed with water. Therefore, when making solutions always carefully follow these steps:

ALWAYS wear ALL protective clothing described above. NEVER add water to product. ALWAYS add product - with constant stirring - slowly to surface of lukewarm (80-100°F) water, to assure product is being completely dissolved as it is added.

If product is added too rapidly, or without stirring, and becomes concentrated at bottom of mixing vessel, excessive heat may be generated, resulting in DANGEROUS boiling and spattering, and a possible IMMEDIATE AND VIOLENT ERUPTION of highly caustic solution.

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PRODUCT NAME: 50% CAUSTIC SODA-DIAPHRAGM

VIII. HANDLING AND STORAGE (Continued)

SPECIAL MIXING AND HANDLING INSTRUCTIONS (Continued)

NOTE: Never add more product than can be absorbed by solution while maintaining temperature below 200°F (@ sea level) to prevent boiling and spattering.

Product can react EXPLOSIVELY with acids, aldehydes, and many other organic chemicals - when mixing product with solutions containing such chemicals, follow all of above mixing instructions, and add product very gradually, while stirring constantly.

ALWAYS empty and clean containers of all residues before adding product, to avoid possible EXPLOSIVE reaction between product and unknown residue.

Returnable containers should be shipped in accordance with supplier's recommendations. Return shipments should comply with all federal, state, and DOT regulations. All residual caustic soda should be removed from containers prior to disposal.

IX. ENVIRONMENTAL PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:

Leaks should be stopped. Spills should be contained and cleaned up immediately. Spills should be removed by using a vacuum truck. Neutralize remaining traces of material with any dilute inorganic acid such as hydrochloric, sulfuric, nitric, phosphoric, and acetic acid. The spill area should then be flushed with water followed by liberal covering of sodium bicarbonate. All clean-up material should be removed and placed in approved containers, labeled and stored in a safe place to await proper treatment or disposal. Spills on areas other than pavement, e.g., dirt or sand, may be handled by removing the affected soils and placing in approved containers. Persons performing clean-up work should wear adequate personal protective equipment and clothing. Spills or releases should be reported, if required, to the appropriate local, state and federal regulatory agencies.

CAUTION: Caustic soda may react violently with acids and water.

WASTE DISPOSAL METHOD:

The materials resulting from clean-up operations may be hazardous wastes and, therefore, subject to specific regulations. Package, store, transport, and dispose of all clean-up materials and any contaminated equipment in accordance with all applicable federal, state, and local health and environmental regulations. Shipments of waste materials may be subject to manifesting requirements per applicable regulations. Appropriate disposal will depend on the nature of each waste material and should be performed by competent and properly permitted contractors. Ensure that all responsible federal, state, and local agencies receive proper notification of spill and disposal methods.

TRW-00415

0908-1781

X. ADDITIONAL INFORMATION

OSHA Standard 29CFR 1910.1200 requires that information be provided to employees regarding the hazards of chemicals by means of a hazard communication program including labeling, material safety data sheets, training and access to written records. We request that you, and it is your legal duty to, make all information in this Material Safety Data Sheet available to your employees.

To aid our customers in complying with regulatory requirements, SARA Title III hazard categories for this product are indicated in Section I. If the word "YES" appears next to any category, this product may be reportable by you under the requirements of 40 CFR Part 370. Please consult those regulations for details.

XI. PREPARATION INFORMATION

For additional Non-Emergency health, safety, or environmental information telephone (716) 286-3081, or write to:
Occidental Chemical Corporation
Product Stewardship Department
Suite 400
360 Rainbow Boulevard South
Niagara Falls, NY 14302

For Emergencies: 24 HOUR EMERGENCY PHONE: (716) 278-7021

This MSDS replaces MSDS Number M4806 dated 07-14-89.

NAME: 50% CAUSTIC SODA-DIAPHRAGM

WARNING LABEL INFORMATION

SIGNAL WORD: DANGER!

STATEMENT OF HAZARDS:

CAUSES SEVERE BURNS TO SKIN, EYES AND MUCOUS MEMBRANES.
CONTACT WITH EYES CAN CAUSE PERMANENT EYE DAMAGE.
INHALATION OF DUST, MIST, OR SPRAY CAN CAUSE SEVERE LUNG DAMAGE.
CAN REACT VIOLENTLY WITH WATER, ACIDS, AND OTHER SUBSTANCES.

PRECAUTIONARY STATEMENTS:

Do not get into eyes, on skin, on clothing.
Avoid breathing dust, mist, or spray.
Do not take internally.
Use with adequate ventilation and employ respiratory protection when exposure to dust, mist, or spray is possible.
When handling, wear chemical splash goggles, face shield, rubber gloves and protective clothing.
Wash thoroughly after handling or contact - exposure can cause burns which are not immediately painful or visible.
Keep container closed.
Product can react violently with water, acids, and other substances - read Handling and Storage instructions carefully before using.
Product is corrosive to tin, aluminum, zinc, and alloys containing these metals, and will react violently with these metals in powder form.
Hazardous carbon monoxide gas can form upon contact with food and beverage products in enclosed spaces and can cause death. Follow appropriate tank entry procedures (ANSI Z117.1-1977).

FIRST AID:

IN CASE OF CONTACT:

FOR EYES:

OBJECT IS TO FLUSH MATERIAL OUT IMMEDIATELY THEN SEEK MEDICAL ATTENTION. IMMEDIATELY flush eyes with large amounts of water for at least 15 minutes forcibly holding lids apart to ensure flushing of entire surface. Washing eyes within several seconds is essential to achieve maximum effectiveness. SEEK MEDICAL ATTENTION IMMEDIATELY.

FOR SKIN:

IMMEDIATELY wash with plenty of water for at least 15 minutes. Remove contaminated clothing and footwear. Wash clothing before reuse and discard footwear which cannot be decontaminated. SEEK MEDICAL ATTENTION IMMEDIATELY.

IF INHALED:

Remove to fresh air. If breathing is difficult, have trained person administer oxygen. If respiration stops, give mouth-to-mouth resuscitation. GET MEDICAL ATTENTION.

IF SWALLOWED:

NEVER give anything by mouth to an unconscious person. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. If available, give several glasses of milk. If vomiting occurs spontaneously, keep airway clear. SEEK MEDICAL ATTENTION IMMEDIATELY.

IN CASE OF:

SPILL OR LEAK:

Leaks should be stopped. Spills, after containment, should be shoveled up or removed by vacuum truck (if liquid) to chemical waste area. Neutralize residue with dilute acid, flush spill area with water followed by liberal covering of sodium bicarbonate. Dispose of wash water and spill by-products according to federal, state, and local regulations.

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WARNING LABEL INFORMATION (Continued)

HANDLING AND STORAGE:

Considerable heat is generated when product is mixed with water. Therefore, when making solutions always carefully follow these steps:

ALWAYS wear ALL prescribed protective clothing. NEVER add water to product. ALWAYS add product - with constant stirring - slowly to surface of lukewarm (80-100°F) water, to assure product is being completely dissolved as it is added.

If product is added too rapidly, or without stirring, and becomes concentrated at bottom of mixing vessel, excessive heat may be generated, resulting in DANGEROUS boiling and spattering, and a possible IMMEDIATE AND VIOLENT ERUPTION of highly caustic solution.

NOTE: Never add more product than can be absorbed by solution while maintaining temperature below 200°F (@ sea level) to prevent boiling and spattering.

Product can react EXPLOSIVELY with acids, aldehydes, and many other organic chemicals - when mixing product with solutions containing such chemicals, follow all of above mixing instructions, and add product very gradually, while stirring constantly.

ALWAYS empty and clean containers of all residues before adding product, to avoid possible EXPLOSIVE reaction between product and unknown residue.

Returnable containers should be shipped in accordance with supplier's recommendations. Return shipments should comply with all federal, state, and DOT regulations. All residual caustic soda should be removed from containers prior to disposal.

DISPOSAL:

The materials resulting from clean-up operations may be hazardous wastes and, therefore, subject to specific regulations. Package, store, transport, and dispose of all clean-up materials and any contaminated equipment in accordance with all applicable federal, state, and local health environmental regulations. Shipments of waste materials may be subject to manifesting requirements per applicable regulations. Appropriate disposal will depend on the nature of each waste material and should be performed by competent and properly permitted contractors. Ensure that all responsible federal, state, and local agencies receive proper notification of disposal.

INFORMATION REQUIRED BY FEDERAL, STATE OR LOCAL REGULATIONS:

This product contains:

CAS#	NAME
1310732	Sodium hydroxide (Na(OH))

7732185	Water
---------	-------

HMIS RATING SYSTEM: HEALTH 3 FLAMMABILITY 0 REACTIVITY 2

FOR INDUSTRIAL USE ONLY

LABEL 097M4806

Caustic Soda

(APPROVED BY THE U.S. DEPARTMENT OF LABOR AS "essentially similar" to form L5B-005-4)

FOR HAZARDOUS PRODUCTS USED IN PLACES OF EMPLOYMENT

Section 1 NAME & PRODUCT

MANUFACTURER'S NAME (a) THE DOW CHEMICAL COMPANY		EMERGENCY PHONE NO. 24 HOURS (b) 517-838-4400
STREET ADDRESS (c) 2030 DOW CENTER	For latest data, consult manufacturer.	DATE THIS FORM WRITTEN (d) June 12, 1971
CITY, STATE, ZIP CODE (e) MIDLAND, MICHIGAN 48640	SIGNATURE OF CERTIFYING COMPANY OFFICIAL (f) <i>[Signature]</i>	
CHEMICAL NAME, TRADE NAME, AND SYNONYMS (g) Caustic Soda Lye, Sodium Hydroxide, White Caustic		
FORMULA OF PRIMARY COMPONENT(S) (STRUCTURAL) (h) NaOH		

Section 2 INGREDIENTS

	%	TLV (units)
NaOH (minimum)	96.8	2 mg/m ³

Section 3 PHYSICAL DATA

BOILING POINT (°F.)	1390 C.	6 SPECIFIC GRAVITY (H ₂ O = 1)	--
7 VAPOR PRESSURE (mmHg at 20°C)	N.A.	7 % VOLATILE BY VOLUME	N.A.
8 VAPOR DENSITY (air=1)	N.A.	8 COLOR AND ODOR	White - none
9 SOLUBILITY IN WATER @ 20°C	109 gm/100 gm	9 PHYSICAL STATE	Solid

Section 4 FIRE AND EXPLOSION HAZARD DATA

10 FLASH POINT (AND METHOD USED) N.A. °F	11 FLAMMABLE LIMITS (STP) L.F.L. Non-flammable U.F.L.
12 EXTINGUISHING MEDIA: <input type="checkbox"/> WATER FOG <input type="checkbox"/> FOAM <input type="checkbox"/> ALCOHOL FOAM <input type="checkbox"/> CO ₂ <input type="checkbox"/> DRY CHEMICAL <input type="checkbox"/> OTHER	
13 SPECIAL FIRE FIGHTING PROTECTIVE EQUIPMENT	

14. UNUSUAL FIRE AND EXPLOSION HAZARDS

In water solution caustic can react with amphoteric metals (such as aluminum) generating hydrogen which is flammable and/or explosive.

Section 5 REACTIVITY DATA

15 STABILITY	NORMAL CONDITIONS	X	16. CONDITIONS TO AVOID
	FIRE CONDITIONS		Melting point 318° C.
17 INCOMPAT- IBILITY (Materials to avoid)	<input type="checkbox"/> WATER		
	<input checked="" type="checkbox"/> ACID		
	<input type="checkbox"/> BASE		
	<input type="checkbox"/> CORROSIVE		
	<input checked="" type="checkbox"/> OTHER: Product is STRONG CAUSTIC ALKALI		

RECEIVED
SEP 16 1974
OXFORD CHEMICAL
STONING MATERIAL
STONING BRANCH

18. HAZARDOUS DECOMPOSITION PRODUCTS

None

19 HAZARDOUS POLYMERIZATION	MAY OCCUR		20 CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

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TRW-00419

(F.P.O.N.)

Section 6 HEALTH HAZARD DATA

21. ORAL INGESTION

Most serious effect is corrosion of tissues. LD₅₀ not available.

22. EYE CONTACT

A burn.

23. SKIN CONTACT

A burn.

24. SKIN ABSORPTION

Not likely a problem.

25. INHALATION (TLV OR SUGGESTED CONTROL FIGURE)

TLV dusts 2 mg/cu meter.

26. EFFECTS OF OVEREXPOSURE

Dusts very irritating to upper respiratory tract. Main effect, tissue damage.

27. FIRST AID PROCEDURES

Inhalation - If any illness occurs get patient to clean fresh air, keep him quiet and warm and get medical attention.

Skin and eyes - Immediately flush with plenty of water for at least 15 minutes. If medical attention has not arrived continue for second 15 minutes. Remove contaminated clothing. Ingestion - Give milk or plenty of water and call physician immediately. **DO NOT induce vomiting.**

Section 7 SPILL OR LEAK PROCEDURES

28. STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Shovel up, follow by flushing with water. Neutralize with dilute acid to remove final traces.

29. DISPOSAL METHOD

Dilute well with water, then neutralize with acid.

Section 8 SPECIAL PROTECTION INFORMATION

VENTILATION	LOCAL EXHAUST	SPECIAL
	X	
	MECHANICAL (General)	OTHER

31. RESPIRATORY PROTECTION (SPECIFY TYPE)

Dust respirator.

32. PROTECTIVE CLOTHING

Clean work clothes, impervious gloves, apron, boots, gauntlets.

33. EYE PROTECTION

☐ NOT NORMALLY NECESSARY ☐ SAFETY GLASSES WITHOUT SIDE SHIELDS ☐ SAFETY GLASSES WITH SIDE SHIELDS - ☒ CHEMICAL WORKERS GOGGLES

☐ GAS TIGHT GOGGLES OR EQUIVALENT ☒ OTHER: Full face shield to protect face.

34. OTHER PROTECTIVE EQUIPMENT

Section 9 SPECIAL PRECAUTIONS OR OTHER COMMENTS

35. PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Avoid eye and skin contact. Product is deliquescent and absorbs H₂O and CO₂ from air. Keep containers closed and sealed. Solution with water generates excessive heat and mist.

36. OTHER PRECAUTIONS

Solutions of greater than 45% are viscous and very slippery.

TRW-00420

APPENDIX D

Form Approved
Budget Bureau No. 44-R1387
Approval Expires April 30, 1971

Form No. LS8-OOS-4
May 1969

U.S. DEPARTMENT OF LABOR

WORKPLACE STANDARDS ADMINISTRATION
Bureau of Labor Standards

MATERIAL SAFETY DATA SHEET

SECTION I	
MANUFACTURER'S NAME PPG Industries, Incorporated	EMERGENCY TELEPHONE NO. (412) 434-3131
ADDRESS (Number, Street, City, State, and ZIP Code) One Gateway Center, Pittsburgh, Pa. 15222	
CHEMICAL NAME AND SYNONYMS Solid and Flake Potassium Hydroxide	TRADE NAME AND SYNONYMS Solid and Flake Caustic Potash
CHEMICAL FAMILY Alkali	FORMULA KOH

SECTION III PHYSICAL DATA					
PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV (Units)

SECTION II HAZARDOUS			
BOILING POINT (°F.)	2408 F	SPECIFIC GRAVITY (H ₂ O=1)	2.044
VAPOR PRESSURE (mm Hg.)	1 mm @	PERCENT VOLATILE BY VOLUME (%)	NA
VAPOR DENSITY (AIR=1)	NA	EVAPORATION RATE (_____ = 1)	NA
SOLUBILITY IN WATER	Appreciable		
APPEARANCE AND ODOR	White to light gray, no odor		

SECTION IV FIRE AND EXPLOSION HAZARD DATA			
FLASH POINT (Method used)	Noncombustible		
EXTINGUISHING MEDIA	FLAMMABLE LIMITS	LeI	UeI
SPECIAL FIRE FIGHTING PROCEDURES			
UNUSUAL FIRE AND EXPLOSION HAZARDS			

SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE
None to assigned to caustic potash; 2 Mg/M³ (Dust, 1969) for comparable

EFFECTS OF OVEREXPOSURE
Solid and flake caustic potash is destructive to tissues, producing severe burns. Dust inhalation can injure respiratory tract.

EMERGENCY AND FIRST AID PROCEDURES
In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes; for eyes, get prompt medical attention. Contaminated clothing and shoes should be removed and washed before re-use.

Caustics da

SECTION VI REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	Avoid contact with some organic material
INCOMPATIBILITY (Materials to avoid) Na			
HAZARDOUS DECOMPOSITION PRODUCTS Na			
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Spilled flake or solid caustic potash may be shoveled up, followed by flushing with water. Dilute acetic acid may be used to neutralize final traces of caustic potash immediately after flushing.

WASTE DISPOSAL METHOD
Waste caustic potash solution should not be discharged directly into sewers or streams. Caustic potash should first be neutralized with dilute acid and then well diluted with water.

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type) Bureau of Mines Approved Filter-Type Dust Respirators		
VENTILATION	LOCAL EXHAUST	SPECIAL
	MECHANICAL (General)	OTHER
PROTECTIVE GLOVES Rubber gloves		Close-fitting safety goggles
OTHER PROTECTIVE EQUIPMENT Rubber boots with safety toes, rubber aprons, PVC clothing, "Hard" hat safety shower, eye-washing fountain.		

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Do not get into eyes, on skin or clothing. Avoid breathing dust. Do not take internally. Wear safety equipment when handling caustic potash.

OTHER PRECAUTIONS

REPORT NUMBER: 971
MSDS NO: DW15216
EFFECTIVE DATE: 01/20/92

VAN WATERS & ROGERS INC.
MATERIAL SAFETY DATA SHEET

PAGE: 001
VERSION: 003

PRODUCT: CAUSTIC SODA SOLUTION 50%

ORDER NO:
PROD NO :

VAN WATERS & ROGERS INC. , SUBSIDIARY OF UNIVAR (206)889-3400
6100 CARILLON POINT , KIRKLAND , WA 98033

----- EMERGENCY ASSISTANCE -----

FOR EMERGENCY ASSISTANCE INVOLVING CHEMICALS CALL - CHEMTREC
(800)424-9300

----- FOR PRODUCT AND SALES INFORMATION -----

CONTACT YOUR LOCAL VAN WATERS & ROGERS BRANCH OFFICE AT
VW&R BOSTON 508-745-3700 SALEM , MA

Product Name:
CAUSTIC SODA SOLUTION 50%

VW&R MSD Number: DW15216

1. INGREDIENTS: (% w/w, unless otherwise noted)

Sodium hydroxide (NaOH)	CAS# 001310-73-2	48.5-50.5%
Sodium carbonate (Na ₂ CO ₃)	CAS# 000497-19-8	<0.2%
Sodium chloride (NaCl)	CAS# 007647-14-5	<1.0%
Water	CAS# 007732-18-5	BAL

This document is prepared pursuant to the OSHA Hazard Communication Standard (29 CFR 1910.1200). In addition, other substances not 'Hazardous' per this OSHA Standard may be listed. Where proprietary ingredient shows, the identity may be made available as provided in this standard.

2. PHYSICAL DATA:

BOILING POINT: Approximately 293F, 145C
FREEZING POINT: Approximately 58F, 14C
VAP. PRESS: 1.5 mmHg, 0.2 kPa @ 20C
VAP. DENSITY: Not applicable
SOL. IN WATER: Water solution
SP. GRAVITY: @ 20C (Dens.) 1.52 g/ml

0908-1789

TRW-00423

REPORT NUMBER: 971
MSDS NO: DW15216
EFFECTIVE DATE: 01/20/92

VAN WATERS & ROGERS INC.
MATERIAL SAFETY DATA SHEET

PAGE: 002
VERSION: 003

PRODUCT: CAUSTIC SODA SOLUTION 50%

ORDER NO:
PROD NO :

APPEARANCE: Colorless to slightly colored liquid.
ODOR: No odor.

3. FIRE AND EXPLOSION HAZARD DATA:

FLASH POINT: None
METHOD USED: Not applicable

FLAMMABLE LIMITS
LFL: Not applic.
UFL: Not applic.

EXTINGUISHING MEDIA: Non-combustible.

FIRE & EXPLOSION HAZARDS: In water solution caustic can react with amphoteric metals (such as aluminum) generating hydrogen which is flammable and/or explosive if ignited.

FIRE-FIGHTING EQUIPMENT: Wear self-contained (positive-pressure if available) breathing apparatus and full protective clothing.

4. REACTIVITY DATA:

STABILITY: (CONDITIONS TO AVOID) Product absorbs carbon dioxide from the air. Keep containers closed and sealed.

INCOMPATIBILITY: Water and acid. Product is strong caustic alkali. May react violently with water, acid, and a number of organic compounds. Caustic reacts rapidly with aluminum, tin, and zinc. It will also react with bronze and brass.

HAZARDOUS DECOMPOSITION PRODUCTS: None.

HAZARDOUS POLYMERIZATION: Will not occur.

5. ENVIRONMENTAL AND DISPOSAL INFORMATION:

ACTION TO TAKE FOR SPILLS/LEAKS: Only trained and properly protected personnel should be involved in spill cleanup operations. Acting cautiously, small accidental spills of caustic soda solution should be carefully flushed with water. Dilute acid, preferably acetic acid, may be used to neutralize only the final traces of caustic after flushing.

DISPOSAL METHOD: Disposal of caustic soda must meet all federal, state, and local regulations. Contact The Dow Chemical Company for additional information.

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MSDS NO: DW15216
EFFECTIVE DATE: 01/20/92

VAN WATERS & ROGERS INC.
MATERIAL SAFETY DATA SHEET

PAGE: 003
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PRODUCT: CAUSTIC SODA SOLUTION 50%

ORDER NO:
PROD NO :

6. HEALTH HAZARD DATA:

EYE: May cause severe irritation with corneal injury and result in permanent impairment of vision, even blindness. Dusts may irritate eyes.

SKIN CONTACT: Short single exposure may cause severe skin burns.

SKIN ABSORPTION: A single prolonged skin exposure is not likely to result in absorption of harmful amounts. The dermal LD50 has not been determined.

INGESTION: May cause gastrointestinal irritation or ulceration and severe burns of the mouth and throat. Single dose oral LD50 has not been determined.

INHALATION: Dusts or mists may cause severe irritation to upper respiratory tract.

SYSTEMIC & OTHER EFFECTS: No relevant information found.

7. FIRST AID:

EYES: WATER is the only accepted method of removal of caustic soda (lye) from the eyes or skin. You may have 10 seconds or less to avoid serious permanent injury. Therefore, IMMEDIATE first aid must be given after any injurious exposure. Moving the victim from water access for transport to medical aid should be done only on the advice of qualified medical personnel. While transporting victim to a medical facility, continue washing if possible.

In case of eye contact, wash eyes immediately and continuously for 30 minutes. Call for medical assistance immediately.

SKIN: Immediate continued and thorough washing in flowing water for 30 minutes is imperative while removing contaminated clothing. Prompt medical consultation is essential. Wash contaminated clothing before reuse. Destroy contaminated shoes.

INGESTION: Do not induce vomiting. Give large amounts of water or milk if available and transport to medical facility.

INHALATION: Remove to fresh air if effects occur. Consult medical.

NOTE TO PHYSICIAN: Corrosive. May cause stricture. If lavage

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VAN WATERS & ROGERS INC.
MATERIAL SAFETY DATA SHEET

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PRODUCT: CAUSTIC SODA SOLUTION 50%

ORDER NO:
PROD NO :

is performed, suggest endotracheal and/or esophagoscopy control. Material is strong alkali. If burn is present, treat as any thermal burn, after decontamination. For burns of skin only. Eye irrigation may be necessary for an extended period of time to remove as much caustic as possible. Duration of irrigation and treatment is at the discretion of medical personnel. No specific antidote. Supportive care. Treatment based on judgment of the physician in response to reactions of the patient.

8. HANDLING PRECAUTIONS:

EXPOSURE GUIDELINE(S): Sodium hydroxide: OSHA PEL and ACGIH TLV are 2 mg/m3 Ceiling.

VENTILATION: Control airborne concentrations below the exposure guideline. Good general ventilation sufficient for most operations.

RESPIRATORY PROTECTION: In misty atmospheres, use an approved mist respirator. If respiratory irritation is experienced, use an approved air-purifying respirator.

SKIN PROTECTION: Use protective clothing impervious to this material. Selection of specific items such as gloves, boots, apron, hard hat with face-shield or full-body suit will depend on operation. Remove contaminated clothing immediately, wash skin area with soap and water, and launder clothing before reuse.

EYE PROTECTION: Use chemical goggles. Full face shield in addition to goggles may be desirable to protect face. Maintain eye wash fountain and safety shower at or near work area.

9. ADDITIONAL INFORMATION:

SPECIAL PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Prevent eye and skin contact. Do not breathe dusts or mists.

Avoid storing next to strong acids. Caustic should be stored in clean, dry areas. Do not store in underground tanks. Product absorbs CO2 from air. Keep containers closed and sealed.

SPECIAL PRECAUTIONS FOR DILUTING CAUSTIC SODA SOLUTION:

1. ALWAYS add caustic soda solution to water with constant agitation. NEVER add water to the caustic soda solution.
2. The water should be lukewarm (80-100F). NEVER start with hot or cold water.

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MSDS NO: DW15216
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PRODUCT: CAUSTIC SODA SOLUTION 50%

ORDER NO:
PROD NO :

The addition of caustic soda to liquid will cause a rise in temperature. If caustic soda becomes concentrated in one area, or is added too rapidly, or is added to hot or cold liquid, a rapid temperature increase can result in DANGEROUS mists or boiling or spattering which may cause an immediate VIOLENT ERUPTION.

MSDS STATUS: Revised section 9 and regsheet.

REGULATORY INFORMATION: (Not meant to be all-inclusive--selected regulations represented).

NOTICE: The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations. See MSD Sheet for health and safety information.

U.S. REGULATIONS

=====

SARA HAZARD CATEGORY: This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

An immediate health hazard

CANADIAN REGULATIONS

=====

The Workplace Hazardous Materials Information System (W.H.M.I.S.) Classification for this product is:

The Transportation of Dangerous Goods Act (T.D.G.A.) classification for this product is:

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PRODUCT: CAUSTIC SODA SOLUTION 50%

ORDER NO :
PROD NO :

Sodium Hydroxide, Solution/Class 8, (9.2)/UN1824/II

FOR ADDITIONAL INFORMATION

CONTACT: MSDS COORDINATOR VW&R BOSTON
DURING BUSINESS HOURS, PACIFIC TIME (206)889-3400

11/05/72 05:14 PRODUCT: CUST NO: ORDER NO:

NOTICE

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IMLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

WITH RESPECT TO THE PRODUCT OR INFORMATION PROVIDED HEREIN. **

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* * * E N D O F M S D S * * *

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D. Bonnick

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved
OMB No. 41-R-1157

MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing,
Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME

Coatings Engineering Corp.

EMERGENCY TELEPHONE NO.

617-633-1500

ADDRESS (Number, Street, City, State, and ZIP Code)

33 Union Ave., Sudbury, MA. 01776

CHEMICAL NAME AND SYNONYM

MEK/MIBK/Isobutanol/resins

TRADE NAME AND SYNONYMS

Coatings Engineering Primer

CHEMICAL FAMILY

FORMULA

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS		n.a	BASE METAL		n.a
CATALYST		n.a	ALLOYS		n.a
VEHICLE	10	n.a	METALLIC COATINGS		n.a
SOLVENTS	90	50ppm	FILLER METAL PLUS COATING OR CORE FLUX		n.a
ADDITIVES		n.a	OTHERS		
OTHERS		n.a			
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV (Units)

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	176	SPECIFIC GRAVITY (H ₂ O=1)	.84
VAPOR PRESSURE (mm Hg.) C 68°F	60	PERCENT VOLATILE BY VOLUME (%)	90
VAPOR DENSITY (AIR=1)	Approx 3.0	EVAPORATION RATE (NBAAC)	2.5
SOLUBILITY IN WATER	Moderate		
APPEARANCE AND ODOR	Colorless Mobile Liquid. Pungent Odor		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	25 °F TCC	FLAMMABLE LIMITS	L _{FL} 1.8	U _{FL} 11.5
EXTINGUISHING MEDIA	Alcohol foam, CO ₂ , dry chemical			
SPECIAL FIRE FIGHTING PROCEDURES	Handle as very flammable liquid.			
UNUSUAL FIRE AND EXPLOSION HAZARDS				

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SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

50 ppm

EFFECTS OF OVEREXPOSURE

Liquid may cause eye burns, dizziness, nausea, headache, lack of coordination.

EMERGENCY AND FIRST AID PROCEDURES

Remove victim to fresh air. Give artificial respiration if breathing has stopped.

SECTION VI - REACTIVITY DATA

STABILITY

UNSTABLE

CONDITIONS TO AVOID

STABLE

X

N.A.

INCOMPATIBILITY (Materials to avoid)

HAZARDOUS DECOMPOSITION PRODUCTS

combustion will produce carbon dioxide
As with any organic material & probably carbon monoxide

HAZARDOUS
POLYMERIZATION

MAY OCCUR

CONDITIONS TO AVOID

N.A.

WILL NOT OCCUR

X

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Eliminate all ignition sources

Flush spill away with water spray. Small spills may be collected with absorbent material.

WASTE DISPOSAL METHOD

Flush with water, controlled burning

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)

Air Pack or Organic Canister

VENTILATION

LOCAL EXHAUST

As Required

SPECIAL

MECHANICAL (General)

OTHER

PROTECTIVE GLOVES

Rubber

EYE PROTECTION

Goggles to prevent splashing in eye

OTHER PROTECTIVE EQUIPMENT

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Very flammable. Prevent skin contact to avoid defatting action.

OTHER PRECAUTIONS

Use normal good personal hygiene.

TRW-00430

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved
OMB No. 44-R1387

MATERIAL SAFETY DATA SHEET

Required under USOL Safety and Health Regulations for Ship Repairing,
Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME Coatings Engineering Corporation		EMERGENCY TELEPHONE NO. 617-653-1500
ADDRESS (Number, Street, City, State, and ZIP Code) 33 Union Avenue, Sudbury, MA 01776		
CHEMICAL NAME AND SYNONYMS NA		TRADE NAME AND SYNONYMS Cecoflex 1108-22
CHEMICAL FAMILY Plastisol	FORMULA Proprietary	

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV (Units)

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	> 565	SPECIFIC GRAVITY (H ₂ O=1)	1.25
VAPOR PRESSURE (mm Hg.)	Nil	PERCENT VOLATILE BY VOLUME (%)	Nil
VAPOR DENSITY (AIR=1)	NA	EVAPORATION RATE (_____ =1)	NA
SOLUBILITY IN WATER	Nil		
APPEARANCE AND ODOR Blue viscous liquid--very mild odor			

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	> 305°F COC	FLAMMABLE LIMITS	Lel	Uel
EXTINGUISHING MEDIA Foam, CO₂, dry chemicals and water fog.				
SPECIAL FIRE FIGHTING PROCEDURES Self-contained breathing apparatus. If suitable respiratory apparatus is not available, leave area.				
UNUSUAL FIRE AND EXPLOSION HAZARDS None				

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SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE
Not established--product not volatile.

EFFECTS OF OVEREXPOSURE
If combusted--eye, nose and throat irritation may occur--leave area.

EMERGENCY AND FIRST AID PROCEDURES
Skin contact--wash thoroughly with soap and water.

Eye contact--Wash eyes with copious amounts of water.

Ingestion--material classed as non-toxic.

SECTION VI - REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	XX	
INCOMPATIBILITY (Materials to avoid) Avoid contact of compound with acetal or amine contained material during processing			
HAZARDOUS DECOMPOSITION PRODUCTS HCl, CO ₂ , CO, and smoke--when combusted.			
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	XX	

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Use inert absorbent such as sand, earth or vermiculite and pick up with shovel.

WASTE DISPOSAL METHOD
Controlled incineration with scrubbers. Designed landfill subject to applicable local, state, or federal regulations.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type) Use air-purifying respirator--if combusted.		
VENTILATION	LOCAL EXHAUST As required	SPECIAL
	MECHANICAL (General)	OTHER
PROTECTIVE GLOVES Oil resistant		EYE PROTECTION Conventional eye cover
OTHER PROTECTIVE EQUIPMENT		

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Normal. No special precautions necessary; however, in accordance with good practice, handle with due care--avoid any unnecessary personal contact

OTHER PRECAUTIONS

TRW-00432



TECHNICAL DATA

CECOFLEX 1108 Series

The Cecoflex 1108 Series are plastisols which were developed to resist chemical and physical attack. They are applied by dipping the preheated metal parts into the plastisol at ambient temperature. These products are used in decorative coatings, hardware, tools, electrical insulators and many other industrial items.

Cecoflex 500A Primer is designed to develop excellent bond strength between the above plastisols and metallic substrates.

Metal Preparation

Parts to be coated should be thoroughly cleaned. Poor cleaning can result in poor or no adhesion between metal and primer. Depending on the condition of the metal, cleaning could require degreasing only or degreasing, alkaline cleaning, rinsing, acid dip, rinsing and drying.

CECOFLEX 500A Primer

Material Specifications

Viscosity: 26± .2 seconds
#1 Zahn cup at 77±°F

Thinner: Cecoflex TH5 for viscosity
and adjustment

Total Solids: 10.3±.1%

Application of Primer

Prime with Cecoflex 500A. Dipping is preferred but spraying or brushing can be used. Viscosity range of primer as received is ideal for dipping or brushing. For spraying, the primer should be reduced to two parts primer and one part Cecoflex TH5 Thinner. Dry film thickness of primer should be .1 to .3 mil.

Air dry the applied primer for 10 to 20 minutes. Insufficient flash-off time may result in blistering during subsequent baking. Bake primer 5 to 20 minutes at 365° to 425°F.

NOTE: The temperatures above are oven temperatures and not metal temperatures. Immediately, while part is still hot, apply plastisol as described below.

CECOFLEX 1108 Series

Material Specifications

Tensile Strength psi.950±50

Elongation %.450

Durometer Shore A44±1

Weight/Gallon9.80±.05

Viscosity cps1500±500

Dielectric Strength v/mil250±50

Coatings Engineering Corporation

33 UNION AVENUE SUDBURY, MASS. 01776 (617)653-1500

TRW-00433

0908-1799

Application of Cecoflex 1108 Series

Apply Cecoflex 1108 Series by dipping the hot metal part immediately into the Cecoflex 1108 at room temperature, and part should remain in the plastisol 15 seconds to 5 minutes. Withdrawal of part should be slow to avoid excess dripping. Bake coated part at 355° to 395°F from 5 to 20 minutes de-

pending on the mass of the object and coating thickness. Baking below 355°F does not completely fuse the film and baking above 395° will result in a degraded coating. In baking any plastisol, there must be a balanced time-temperature cycle for optimum results.

For Industrial Use Only

Coatings Engineering Corporation gives no warranty, express or implied, and all products are sold upon condition that purchases will make their own tests to determine the quality and suitability of the product. Coatings Engineering Corporation shall be in no way responsible for the proper use and service of the product. Any information or suggestions given are without warranty of any kind and purchasers are solely responsible for any loss arising from the use of such information or suggestions. No information or suggestions given by us shall be deemed to be a recommendation to use any product in conflict with any existing patent rights.

TRW-00434

0908-1800

IV HEALTH HAZARD DATA

ROUTES OF EXPOSURE:

GRINDING CEMENTED CARBIDE PRODUCT WILL PRODUCE DUST OF POTENTIALLY HAZARDOUS INGREDIENTS WHICH CAN BE INHALED, SWALLOWED OR COME IN CONTACT WITH THE SKIN OR EYES.

EFFECTS OF OVEREXPOSURE:

- INHALATION - DUST FROM GRINDING CAN CAUSE IRRITATION OF THE NOSE AND THROAT. IT ALSO HAS THE POTENTIAL FOR CAUSING TRANSIENT OR PERMANENT RESPIRATORY DISEASE, INCLUDING OCCUPATIONAL ASTHMA AND INTERSTITIAL FIBROSIS, IN A SMALL PERCENTAGE OF EXPOSED INDIVIDUALS. IT IS REPORTED THAT COBALT DUST IS THE MOST PROBABLE CAUSE OF SUCH RESPIRATORY DISEASES. SYMPTOMS INCLUDE PRODUCTIVE COUGH, WHEEZING, SHORTNESS OF BREATH, CHEST TIGHTNESS AND WEIGHT LOSS. INTERSTITIAL FIBROSIS (LUNG SCARRING) CAN LEAD TO PERMANENT DISABILITY OR DEATH. CERTAIN PULMONARY CONDITIONS MAY BE AGGRAVATED BY EXPOSURE.
- SKIN CONTACT - CAN CAUSE AN IRRITATION OR SKIN RASH DUE TO COBALT SENSITIZATION. CERTAIN SKIN CONDITIONS, SUCH AS DRY SKIN, MAY BE AGGRAVATED BY EXPOSURE.
- EYE CONTACT - CAN CAUSE IRRITATION.
- INGESTION - REPORTS OUTSIDE THE INDUSTRY SUGGEST THAT INGESTION OF SIGNIFICANT AMOUNTS OF COBALT HAS THE POTENTIAL FOR CAUSING BLOOD, HEART AND OTHER ORGAN PROBLEMS.

EMERGENCY AND FIRST AID PROCEDURES: APPLICABLE FOR DUSTS OR MISTS

- INHALATION - IF SYMPTOMS OF PULMONARY INVOLVEMENT DEVELOP (COUGHING, WHEEZING, SHORTNESS OF BREATH, ETC.) REMOVE FROM EXPOSURE AND SEEK MEDICAL ATTENTION.
- SKIN CONTACT - IF IRRITATION OR RASH OCCURS, THOROUGHLY WASH AFFECTED AREA WITH SOAP AND WATER AND ISOLATE FROM EXPOSURE. IF IRRITATION OR RASH PERSISTS, SEEK MEDICAL ATTENTION.
- EYE CONTACT - IF IRRITATION OCCURS, FLUSH WITH COPIOUS AMOUNTS OF WATER. IF IRRITATION PERSISTS, SEEK MEDICAL ATTENTION.
- INGESTION - IF SUBSTANTIAL QUANTITIES ARE SWALLOWED, DILUTE WITH A LARGE AMOUNT OF WATER, INDUCE VOMITING AND SEEK MEDICAL ATTENTION.

CARCINOGENIC ASSESSMENT (NTP ANNUAL REPORT, IARC MONOGRAPHS, OTHER):

NONE OF THE COMPONENTS OF THIS MATERIAL HAVE BEEN IDENTIFIED AS KNOWN OR SUSPECTED CARCINOGENS BY NTP, IARC OR OSHA.

I PRODUCTION IDENTIFICATION

DEVLIEG MICROBORE TOOLING SYSTEMS
DIVISION OF DEVLIEG MACHINE COMPANY

ADDRESS: FAIR STREET TELEPHONE NO. (313) 280-1100
ROYAL OAK, MICHIGAN 48068

CHEMICAL NAME: CEMENTED TUNGSTEN CARBIDE WITH BINDERS

TRADE NAME AND
SYNONYMS: ALL DEVLIEG CEMENTED TUNGSTEN AND TITANIUM CARBIDE
PRODUCTS. ONE OR MORE OF THE MAJOR OR MINOR CARBIDE
MANUFACTURERS MAY BE REPRESENTED UNDER THE DEVLIEG
LABEL. SPECIFIC COMPOSITIONS AVAILABLE UPON REQUEST
FROM THE MATERIAL MANUFACTURER OR THIS FABRICATOR.

CHEMICAL FAMILY: REFRACTORY METAL CARBIDE

MOLECULAR WEIGHT: N/A

II PHYSICAL DATA

APPEARANCE AND ODOR: DARK GRAY METAL/ NO ODOR
BOILING POINT: N/A SPECIFIC GRAVITY ($H_2O=1$): 5 TO 15.5
MELTING POINT: N/A PER CENT VOLATILE BY VOLUMN: 0
VAPOR PRESSURE (MM HG): N/A EVAPORATION RATE: N/A
VAPOR DENSITY (AIR=1): N/A HOW BEST MONITORED: AIR SAMPLE
SOLUBILITY IN WATER: INSOLUBLE

III HAZARDOUS INGREDIENTS

MATERIAL	% BY WEIGHT	OSHA PEL	ACGIH TLV
CHROMIUM	0.0 - 5.1%	1.0 MG/M3	0.5 MG/M3
COBALT	0.0 - 30%	0.1 MG/M3	0.1 MG/M3
HAFNIUM	0.0 - 6%	-----	-----
MOLYBDENUM	0.0 - 50%	15.0 MG/M3	10.0
NICKEL	0.0 - 16%	1.0 MG/M3	1.0 MG/M3
NIOBIUM	0.0 - 15%	5.0 MG/M3	5.0 MG/M3
TANTALUM	0.0 - 50%	5.0 MG/M3	5.0 MG/M3
TITANIUM	0.0 - 14%	-----	-----
TUNGSTEN	5.3 - 97%	-----	5.0 MG/M3
VANADIUM	0.0 - .4%	-----	.05 MG/M3

V FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: N/A TEST METHOD USED: -- FLAMMABLE LIMITS: N/A LEL:--- UEL:---

HARD CEMENTED CARBIDE PRODUCT IS NOT A FIRE HAZARD. DUSTS GENERATED IN GRINDING OPERATIONS MAY IGNITE IF ALLOWED TO ACCUMULATE AND SUBJECTED TO AN IGNITION SOURCE.

EXTINGUISHING MEDIA: FOR POWDER FIRES, SMOTHER WITH DRY SAND, DRY DOLOMITE, ABC TYPE FIRE EXTINGUISHER, OR FLOOD WITH WATER.

SPECIAL FIRE FIGHTING PROCEDURES:

FOR A POWDER FIRE CONFINED TO SMALL AREA, USE A RESPIRATOR APPROVED FOR TOXIC DUSTS AND FUMES. FOR A LARGE FIRE INVOLVING THIS MATERIAL, FIRE FIGHTERS SHOULD USE SELF-CONTAINED BREATHING APPARATUS.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

DUSTS MAY PRESENT A FIRE OR EXPLOSION HAZARD UNDER RARE FAVORING CONDITIONS OF PARTICLE SIZE, DISPERSION AND STRONG IGNITION SOURCE. HOWEVER, THIS IS NOT EXPECTED TO BE A PROBLEM UNDER NORMAL HANDLING CONDITIONS.

VI REACTIVITY DATA

STABILITY: UNSTABLE CONDITIONS TO AVOID: N/A
STABLE X

INCOMPATIBILITY: CONTACT OF DUST WITH STRONG OXIDIZERS MAY CAUSE FIRE OR EXPLOSIONS - MATERIALS TO AVOID: STRONG ACIDS

HAZARDOUS DECOMPOSITION PRODUCTS: NONE

HAZARDOUS POLYMERIZATION: MAY OCCUR CONDITIONS TO AVOID: N/A
WILL NOT OCCUR X

VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: VENTILATE AREA OF SPILL. CLEAN UP USING METHODS WHICH AVOID DUST GENERATION SUCH AS VACUUM (WITH APPROPRIATE FILTER TO PREVENT AIRBORNE DUST LEVELS WHICH EXCEED THE PEL OR TLV), WET DUST MOP OR WET CLEAN-UP. IF AIRBORNE DUST IS GENERATED, USE AN APPROPRIATE NIOSH APPROVED RESPIRATOR.

WASTE DISPOSAL METHOD:

DISPOSE OF IN ACCORDANCE WITH APPROPRIATE GOVERNMENT REGULATIONS. MAY BE SOLD AS SCRAP FOR RECLAIM.

VIII SPECIAL PROTECTION INFORMATION (CONTINUED)

PERSONAL PROTECTIVE EQUIPMENT:

RESPIRATORY PROTECTION:	IF FUMES, MISTING OR DUST CONDITION OCCURS AND T.L.V. AS INDICATED IN SECTION II IS EXCEEDED, PROVIDE NIOSH APPROVED RESPIRATORS.
EYE PROTECTION:	RECOMMEND APPROVED SAFETY GLASSES OR GOGGLES WHEN WORKING WITH DUSTY MATERIAL.
GLOVES:	AS REQUIRED
OTHER CLOTHING OR EQUIPMENT:	AS REQUIRED

IX SPECIAL PRECAUTIONS

USE GOOD HOUSEKEEPING PRACTICES TO PREVENT ACCUMULATIONS OF DUSTS AND TO KEEP AIRBORNE DUST CONCENTRATION AT A MINIMUM.

THIS MATERIAL IS POTENTIALLY CONTAMINATED WITH COATINGS SUCH AS OILS FOR PRESERVATIVES AND OTHER CONTAMINANTS. IF THE MATERIAL IS CONTAMINATED, SPECIAL PRECAUTIONS (SUCH AS PROCESS CONTROL AND PERSONAL PROTECTIVE EQUIPMENT APPROPRIATE TO THE NATURE OF THE SUSPECTED CONTAMINANTS SHOULD BE TAKEN TO AVOID RESULTING EXPOSURES WHEN HANDLING, CUTTING (THERMAL OR MECHANICAL) AND/OR HEATING OR MELTING.

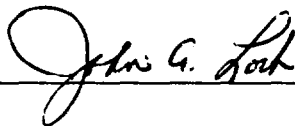
ALTHOUGH DEVLIEG MICROBORE TOOLING SYSTEMS DIVISION OF DEVLIEG MACHINE COMPANY HAS ATTEMPTED TO PROVIDE CURRENT AND ACCURATE INFORMATION HEREIN, DEVLIEG MICROBORE TOOLING SYSTEMS MAKES NO REPRESENTATIONS REGARDING THE ACCURACY OR COMPLETENESS OF THE INFORMATION AND ASSUMES NO LIABILITY FOR ANY LOSS, DAMAGE, INJURY OF ANY KIND WHICH MAY RESULT FROM OR ARISE OUT OF THE USE OF OR RELIANCE ON THE INFORMATION BY ANY PERSON.

IN CASE OF QUESTIONS PLEASE CALL:
DEVILIEG MICROBORE TOOLING SYSTEMS
DIVISION OF DEVLIEG MACHINE COMPANY
FAIR STREET
ROYAL OAK, MICHIGAN 48068
(313) 280-1100

ISSUE DATE:

SUPERSEDES: N/A

BY



TITLE Manager, Safety

MATERIAL SAFETY DATA SHEET

REV DATE: 080989

510100

CERFAK N-100

SECTION I-PRODUCT IDENTIFICATION

PRODUCT NAME: CERFAK N-100

PROPER SHIPPING NAME: CLEANING COMPOUND, LIQUID

HAZARD CLASS: NON-HAZARDOUS

HAZARD ID NO: N/A

CHEMICAL FAMILY: MIXTURE

COMPLETED BY: ROBERT E. WILLIAMS

PHONE NUMBER: (215) 666-4105

MFR. DUNS #: 00-226-1535

SECTION II-HAZARDOUS COMPONENTS

MATERIAL	CAS NO	% BY WT.	HAZARD
DIETHANOLAMINE	111-42-2	10-30	TLV: 3 PPM PEL: 3 PPM
(PRODUCT USE DILUTION IN WATER: 0.5- 5.0%)			

SECTION III-PHYSICAL DATA

BOIL. PT. (DEG F): N/A	SPECIFIC GRAVITY: 0.98
VAPOR PRESSURE (MM HG) NIL	EVAP RATE: N/A
VAPOR DENSITY (AIR = 1) >1	SOL IN WATER: COMPLETE
PERCENT VOLATILE: NIL	
PH NEAT: N/A PH AT %:	
APPEARANCE AND ODOR:	
LIGHT REDDISH FLUID, FATTY ODOR	

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT, DEG. F (METHOD USED): 350 C.D.C. LEL: N/D UEL: N/D
NFPA CLASSIFICATION HEALTH: 0 FIRE: 1 REACTIVITY: 0
EXTINGUISHING MEDIA:
CARBON DIOXIDE, FOAM, DRY CHEMICAL
SPECIAL FIRE FIGHTING INSTRUCTIONS:
NONE
UNUSUAL FIRE AND EXPLOSION HAZARDS:
NONE

CONTINUED ON PAGE 2

TRW-00439

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SECTION V - HEALTH HAZARD INFORMATION

=====

THRESHOLD LIMIT VALUE: SEE SECTION 2

PERMISSIBLE EXPOSURE LIMIT: SEE SECTION 2

ROUTES OF EXPOSURE

CHRONIC (RECURRENT) EFFECTS : UNKNOWN FOR THIS PRODUCT.

ACUTE EFFECTS :

INHALATION:

AVOID BREATHING PRODUCT MISTS OR VAPORS, WHICH MAY CAUSE IRRITATION OF UPPER RESPIRATORY TRACT. PERSONS WITH CHRONIC RESPIRATORY DISEASE MAY SHOW INCREASED SYMPTOMS DUE TO IRRITATION.

SKIN:

MAY BE A MILD IRRITANT TO SKIN ON PROLONGED CONTACT.

EYE:

MILD IRRITANT

INGESTION:

NO SIGNIFICANT EFFECTS KNOWN

***** FIRST AID *****

INHALATION:

REMOVE TO SOURCE OF FRESH AIR

SKIN:

WASH OR FLUSH WITH WATER

EYE:

FLUSH WITH WATER 15 MINUTES; CONSULT PHYSICIAN IF IRRITATION PERSISTS

INGESTION:

INDUCE VOMITING; CONSULT PHYSICIAN. PRODUCT IS A FATTY ACID ALKANOLAMIDE SURFACTANT

*** MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE ***

NONE KNOWN

=====

SECTION VI - REACTIVITY DATA

=====

STABILITY: STABLE: [X] UNSTABLE: []

INCOMPATIBILITY (MATERIALS TO AVOID):

STRONG OXIDIZERS

HAZARDOUS DECOMPOSITION PRODUCTS:

THERMAL; OXIDES OF CARBON AND NITROGEN

HAZARDOUS POLYMERIZATION: MAY OCCUR: [] WILL NOT OCCUR: [X]

CONTINUED ON PAGE 3

TRW-00440

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SECTION VII - SPILL OR LEAK PROCEDURES

=====

POTENTIAL AS A POLLUTANT:

NOT CONSIDERED A POLLUTANT. EFFECTIVE WASTE DISPOSAL
METHODS SHOULD BE UTILIZED. MATERIAL IS BIODEGRADABLE.

SPILL, LEAK OR RELEASE:

APPLY OIL ABSORBENT TYPE MATERIAL AND SWEEP UP. DILUTE ANY
RESIDUE WITH WATER AND MOP UP THOROUGHLY TO AVOID ANY
RESIDUAL SLIPPERINESS.

WASTE DISPOSAL:

DILUTE WITH WATER AND TRANSFER TO SEWAGE OR WASTE DISPOSAL
SYSTEM WHICH PROVIDES BIOLOGICAL OXIDATION.
NEAT PRODUCT MAY BE INCINERATED UNDER CONTROLLED CONDITIONS.

=====

SECTION VIII - SPECIAL PROTECTION INFORMATION

=====

RESPIRATORY PROTECTION:

REQUIRED ONLY IF TLV FOR DIETHANOLAMINE IS EXCEEDED.

VENTILATION:

EXHAUST TYPE IF MISTING; OTHERWISE GENERAL TYPE IS SATISFACTORY.

PROTECTIVE GLOVES:

RUBBER IF SKIN IS SENSITIVE

EYE PROTECTION:

SAFETY GOGGLES IF SPLASHING

OTHER PROTECTIVE EQUIPMENT:

NOT REQUIRED

=====

SECTION IX - SPECIAL PRECAUTIONS

=====

STORAGE AND HANDLING CONDITIONS:

AVOID CONTACT WITH STRONG OXIDIZERS

=====

ADDITIONAL PRODUCT INFORMATION

=====

CARCINOGENS AS DEFINED BY - NTP: NONE IARC: NONE OSHA: NONE.

CERCLA REPORTABLE QUANTITY (LBS) :
NONE

RCRA HAZARDOUS WASTE NUMBER :
N/A

SARA TITLE III, SECTION 313

THIS PRODUCT CONTAINS NO TOXIC CHEMICAL SUBJECT TO THE
REPORTING REQUIREMENTS OF SECTION 313 OF TITLE III OF THE
SUPERFUND AMENDMENTS AND AUTHORIZATION ACT OF 1986 AND 40 CFR
PART 372 OTHER THAN A MAXIMUM OF :

30% DIETHANOLAMINE (CAS 111-42-2)

3/5/85
Cap
D. Sarsak

Whittaker

Providence Chemicals Division
King Philip Road
Post Office Box 16069
East Providence, Rhode Island 02916
401-434-1770 Telex 92-7652

February 19, 1985

Ms. E. Giovennella
TRW-Fasteners Division
31 Ames Street
Cambridge, MA 02138

Dear Ms. Giovennella:

We have enclosed Material Safety Data Sheets on the Chem-O-Sol products you have purchased from Whittaker and/or Chemical Products in years past.

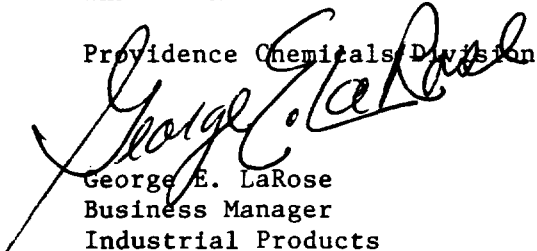
The materials are all dispersions of polyvinyl chloride resin in plasticizers and are generically known as vinyl plastisols.

We hope this information satisfies your needs. Should you require anything further, please do not hesitate to contact us.

Sincerely,

WHITTAKER

Providence Chemicals Division


George E. LaRose
Business Manager
Industrial Products

GEL:js

Enclosures: R-8644 White Chem-O-Sol (MSDS)
R-8273 Clear Chem-O-Sol "
X-9143 Gray Chem-O-Sol "

TRW-00442

0908-1808

RECEIVED

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AUG 19 1985

D. BORSUK

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health AdministrationForm Approved
OMB No. 44-R1387**MATERIAL SAFETY DATA SHEET**Required under USDL Safety and Health Regulations for Ship Repairing,
Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)**SECTION I**

MANUFACTURER'S NAME

Providence Chemicals Division, Whittaker Corp.

EMERGENCY TELEPHONE NO.

(401) 434-1770

ADDRESS (Number, Street, City, State, and ZIP Code)

King Philip Road, East Providence, Rhode Island 02914

CHEMICAL NAME AND SYNONYMS

TRADE NAME AND SYNONYMS

D-3320 Blue Chem-O-Sol

CHEMICAL FAMILY

Vinyl Plastisol

FORMULA

Proprietary

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL -		
CATALYST -			ALLOYS -		
VEHICLE -			METALLIC COATINGS (Not Applicable)		
SOLVENTS -			FILLER METAL PLUS COATING OR CORE FLUX -		
ADDITIVES -			OTHERS -		
OTHERS -					
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV (Units)
Inorganic salt of Lead Sulfate CAS#7446142				2.5	
				As Pb	0.05mg/M ³

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	N/A	SPECIFIC GRAVITY (H ₂ O=1)	1.18
VAPOR PRESSURE (mm Hg.)	N/A	PERCENT VOLATILE BY VOLUME (%)	Nil
VAPOR DENSITY (AIR=1)	N/A	EVAPORATION RATE (_____ =1)	N/A
SOLUBILITY IN WATER	Nil		
APPEARANCE AND ODOR	Mild Odor, blue Liquid		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	410°F. (C.O.C.)	FLAMMABLE LIMITS	LeI	UeI
EXTINGUISHING MEDIA	CO ₂ , Dry Chemical, Foam, Water Fog			
SPECIAL FIRE FIGHTING PROCEDURES	Do not use water jet as frothing may promote flame spread.			
UNUSUAL FIRE AND EXPLOSION HAZARDS	May release HCL and CO under extreme heat or when burned.			
	Do not inhale smoke or fumes.			

TRW-00443

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

N/A

EFFECTS OF OVEREXPOSURE

Eye & Skin Contact: - May cause reddening.

Ingestion: - May cause diarrhea. Contains salts of heavy metals.

EMERGENCY AND FIRST AID PROCEDURES

Skin Contact: Wash with soap & water.

Eye Contact: Flush with water for 15 minutes, consult a physician.

Ingestion: Induce vomiting, consult a physician.

SECTION VI - REACTIVITY DATA

STABILITY

UNSTABLE

CONDITIONS TO AVOID

STABLE

X

INCOMPATIBILITY (Materials to avoid)

Strong oxidizing agents (Acids)

HAZARDOUS DECOMPOSITION PRODUCTS

HCl, CO, CO₂

HAZARDOUS
POLYMERIZATION

MAY OCCUR

CONDITIONS TO AVOID

WILL NOT OCCUR

X

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Cover with absorbent material and collect in a suitable container.

WASTE DISPOSAL METHOD

Burial in an approved landfill, or controlled incineration. In accordance with current regulations.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)

VENTILATION

LOCAL EXHAUST

During fusing

SPECIAL

MECHANICAL (General)

During fusing

OTHER

PROTECTIVE GLOVES

Recommended

EYE PROTECTION

Recommended

OTHER PROTECTIVE EQUIPMENT

TRW-00444

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Store away from direct sunlight & other heat sources. Avoid contact with skin, wash thoroughly after handling. Contains salts of heavy metals.

OTHER PRECAUTIONS

Do not inhale fumes given off during fusing. Exhaust fusing ovens & provide adequate ventilation.

PAGE (2)
SPD 920-940

While the information & recommendations set forth herein are believed to be accurate as of the date hereof, Providence Chemicals Div. makes no warranty with respect thereto and disclaims all liability from reliance thereon.

Form OSHA-20
Rev. May 72

August 8, 1985

0908-1810

MORTON INTERNATIONAL / INDUSTRIAL COATINGS
KING PHILIP ROAD EAST PROVIDENCE, RI 02916
PHONE NO 401-434-1770 EMERGENCY NO.

DATE 4/27/90

EMERGENCY NO. CALL CHEMTREC 800-424-9300

TRADE NO & NAME D4497 BLUE CHEM-O-SOL

#	DESCRIPTION	CAS NO	PERCENT BY WEIGHT	* PPM TWA * ACGIH TLV	OSHA PEL	LEL	VAPOR PRESSURE mmHg@20C
			PERCENT BY SOLIDS	*mg/M3 ACGIH TLV	TWA* OSHA PEL		
1	LEAD COMPOUND(S)		2.162	.15	.05		

BOILING RANGE	N/A	DEG F
% VOLATILE BY VOLUME	NIL	
WEIGHT PER GALLON	9.81	

VAPOR DENSITY - NOT APPLICABLE
EVAPORATION RATE - NOT APPLICABLE

DOT CATEGORY	NON-HAZARDOUS	FLASH POINT	>390 DEG F	PMCC	LEL	N/A
--------------	---------------	-------------	------------	------	-----	-----

EXTINGUISHING MEDIA Use National Fire Protection Association (NFPA) Class B extinguisher carbon dioxide, dry chemical or foam designed to extinguish NFPA Class I B flammable liquid fires

UNUSUAL FIRE AND EXPLOSION HAZARDS Keep containers tightly closed.
Isolate from heat.

SPECIAL FIRE FIGHTING PROCEDURES Water spray may be ineffective. Water may be used to cool closed containers to prevent pressure build up and possible autoignition or explosion when exposed to extreme heat. If water is used, fog nozzles are preferable.

** CONTINUED **

TRW-00445

MORTON INTERNATIONAL / INDUSTRIAL COATINGS
TRADE NO & NAME D4497 BLUE CHEM-O-SOL

DATE 4, /9

SECTION V - HEALTH HAZARD DATA

EFFECTS OF OVEREXPOSURE Inhalation: Anesthetic. Irritation of the respiratory tract or acute nervous system, depression characterized by headache, dizziness, staggering gait, confusion, unconsciousness or coma
Skin or Eye Contact: Primary irritation.

EMERGENCY AND FIRST AID PROCEDURES Fumes: Remove from exposure. Restore breathing. Keep warm and quiet. Notify a physician. Splash (eyes): Flush immediately with copious quantities of running water for at least 15 minutes. Take to a physician for a definitive medical treatment.
Splash (skin): remove with soap and water. Remove contaminated clothing.

NOTES : The items listed in SECTION II are believed to have the following health effects (See SEC X for explanation)

1:8b,c,d,f;9

SECTION VI - REACTIVITY DATA

STABILITY Stable

HAZARDOUS DECOMPOSITION PRODUCTS May produce hazardous fumes when heated to decomposition as in welding. Fumes may contain carbon monoxide and HCl, as well as oxides of any heavy metals listed in Section II.

HAZARDOUS POLYMERIZATION Will not occur

CONDITIONS TO AVOID Not applicable

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL RELEASED OR SPILLED Ventilate area. Remove with inert absorbent.

WASTE DISPOSAL METHOD Dispose of in accordance with local, state and federal regulations.

** CONTINUED **

MORTON INTERNATIONAL / INDUSTRIAL COATINGS
TRADE NO & NAME D4497 BLUE CHEM-O-SOL

DATE 4/27/90

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION In outdoor or open areas use Bureau of Mines approved mechanical filter respirator to remove solid air borne particles of overspray during spray application. In restricted ventilation areas use Bureau of Mines approved chemical-mechanical filters designed to remove a combination of particulate and gas and vapor. In confined areas use Bureau of Mines approved air line type respirators or hoods.

VENTILATION Provide general dilution or local exhaust ventilation during spray and/or fusing in volume and pattern to keep TLV of most hazardous ingredient in Section II below acceptable limit, LEL in Section II below stated limit, and to remove decomposition product welding or flame cutting on surfaces coated with this product.

PROTECTIVE GLOVES Required for prolonged or repeated contact.

EYE PROTECTION Use safety eyewear designed to protect against splash of liquids.

OTHER PROTECTIVE EQUIPMENT Prevent prolonged skin contact with contaminated clothing.

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING Do not store above 120 deg F.

OTHER PRECAUTIONS Do not take internally. Avoid free fall of liquid in excess of a few inches. Do not flame cut, braze, or weld without U.S. Bureau of Mines approved respirator or appropriate ventilation.

** CONTINUED **

TRW-00447

0908-1813

MORTON INTERNATIONAL / INDUSTRIAL COATINGS
TRADE NO & NAME D4497 BLUE CHEM-O-SOL

DATE 4, /90

SECTION X SPECIFIC HEALTH HAZARD INFORMATION (SEE SECTION V)

- 8 Repeat exposure may result in damage to or abnormalities of the following: a) liver, b) kidneys, c) brain or nervous system, d) blood, e) lungs, f) reproductive organs, g) skin, h) eyes.
- 9 Repeat exposure may cause fetal death or birth defects.

SECTION XI - SUPPLIER NOTIFICATION

This product contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 and of 40 CFR 372. If you are unsure if you must report or require more information, call the EPA Emergency Planning and Community Right-To-Know Hotline: (800) 535-0202 or (202) 479-2449 (in Washington DC or Alaska).

CHEMICAL NAME	CAS NO	% BY WEIGHT

LEAD COMPOUND(S)		2.16

TRW-00448

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U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved
OMB No. 44-R1387

MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing,
Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME Providence Chemicals Division, Whittaker Corp.		EMERGENCY TELEPHONE NO. (401) 434-1770
ADDRESS (Number, Street, City, State, and ZIP Code) King Philip Road, East Providence, Rhode Island 02914		
CHEMICAL NAME AND SYNONYMS		TRADE NAME AND SYNONYMS R-8644 White Foam Chem-O-Sol
CHEMICAL FAMILY Vinyl Plastisol	FORMULA Proprietary	

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL	-	
CATALYST	-		ALLOYS	-	
VEHICLE	-		METALLIC COATINGS (Not Applicable)		
SOLVENTS	-		FILLER METAL PLUS COATING OR CORE FLUX	-	
ADDITIVES	-		OTHERS	-	
OTHERS	-				

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
Inorganic salts of lead	less than	2

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	N/A	SPECIFIC GRAVITY (H ₂ O=1)	1.20
VAPOR PRESSURE (mm Hg.)	N/A	PERCENT VOLATILE BY VOLUME (%)	Nil
VAPOR DENSITY (AIR=1)	N/A	EVAPORATION RATE (_____ =1)	N/A
SOLUBILITY IN WATER	Nil		
APPEARANCE AND ODOR	Mild Odor, White Liquid		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	410°F. (C.O.C.)	FLAMMABLE LIMITS	Lel	Uel
EXTINGUISHING MEDIA	CO ₂ , Dry Chemical, Foam, Water Fog			
SPECIAL FIRE FIGHTING PROCEDURES Do not use water jet as frothing may promote flame spread.				
UNUSUAL FIRE AND EXPLOSION HAZARDS May release HCL and CO under extreme heat or when burned. Do not inhale smoke or fumes.				

TRW-00449

SECTION V - HEALTH HAZARD DATA	
THRESHOLD LIMIT VALUE	
N/A	
EFFECTS OF OVEREXPOSURE	
Eye & Skin Contact: - May cause reddening.	
Ingestion: - May cause diarrhea. Contains salts of heavy metals.	
EMERGENCY AND FIRST AID PROCEDURES	
Skin Contact: Wash with soap & water.	
Eye Contact: Flush with water for 15 minutes, consult a physician.	
Ingestion: Induce vomiting, consult a physician.	

SECTION VI - REACTIVITY DATA			
STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	
INCOMPATIBILITY (Materials to avoid)			
Strong oxidizing agents (Acids)			
HAZARDOUS DECOMPOSITION PRODUCTS			
HCl, CO, CO ₂			
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII - SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	
Cover with absorbent material and collect in a suitable container.	
WASTE DISPOSAL METHOD	
Burial in an approved landfill, or controlled incineration. In accordance with current regulations.	

SECTION VIII - SPECIAL PROTECTION INFORMATION			
RESPIRATORY PROTECTION (Specify type)			
VENTILATION	LOCAL EXHAUST	SPECIAL	
	MECHANICAL (General)	OTHER	
PROTECTIVE GLOVES		EYE PROTECTION	
Recommended		Recommended	
OTHER PROTECTIVE EQUIPMENT			

SECTION IX - SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING	
Store away from direct sunlight & other heat sources. Avoid contact with skin, wash thoroughly after handling. Contains salts of heavy metals.	
OTHER PRECAUTIONS	
Do not inhale fumes given off during fusing. Exhaust fusing ovens & provide adequate ventilation.	

PAGE (2) While the information & recommendations set forth herein are believed to be accurate as of the date hereof, Providence Chemicals Div. makes no warranty with respect thereto and disclaims all liability from reliance thereon.

GPO 930-540

Form OSHA-20
Rev. May 72

2/18/85

TRW-00450

0908-1816

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

TRW Fasteners
Dick Norcross

Form Approved
OMB No. 44-R1387

MATERIAL SAFETY DATA SHEET

Required under USOL Safety and Health Regulations for Ship Repairing,
Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME Providence Chemicals Division, Whittaker Corporation		EMERGENCY TELEPHONE NO. (401) 434-1770
ADDRESS (Number, Street, City, State, and ZIP Code) King Philip Road, East Providence, Rhode Island 02916		
CHEMICAL NAME AND SYNONYMS		TRADE NAME AND SYNONYMS R-7932 Black Chem-0-Sol
CHEMICAL FAMILY Vinyl Plastisol	FORMULA Proprietary	

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV (Units)
Phenolic Resin				as Phenol 108 95 2 ≤ as formaldehyde 50-00-0 ≤	0.15 5ppm 0.1 2ppm
Di-2-ethyl hexyl phthalate CAS#117-81-7				≤	25 5mg/M ³
Calcium Oxide CAS#13505-78-8				≤	3 5mg/M ³

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	N/A	SPECIFIC GRAVITY (H ₂ O=1)	1.25
VAPOR PRESSURE (mm Hg.)	N/A	PERCENT VOLATILE BY VOLUME (%)	N/A
VAPOR DENSITY (AIR=1)	N/A	EVAPORATION RATE (_____ =1)	N/A
SOLUBILITY IN WATER	N/A		
APPEARANCE AND ODOR Black Liquid - Mild Odor			

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	Above 200°F.	FLAMMABLE LIMITS	Lel	Uel
EXTINGUISHING MEDIA	CO ₂ , Dry Chemical, Foam, Water Fog			
SPECIAL FIRE FIGHTING PROCEDURES	Do not use water jet as frothing may promote flame spread.			
UNUSUAL FIRE AND EXPLOSION HAZARDS	May release HCl and CO under extreme heat or when burned. Do not inhale smoke or fumes.			

SECTION V - HEALTH HAZARD DATA	
THRESHOLD LIMIT VALUE	See Section II
EFFECTS OF OVEREXPOSURE	Prolonged or repeated contact may cause skin irritation. Ingestion causes gastrointestinal irritation, vomiting or depression.
EMERGENCY AND FIRST AID PROCEDURES	In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing & shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean contaminated shoes. If swallowed, induce vomiting immediately by giving 2 glasses of water & sticking finger down throat. Never give anything by mouth to an unconscious person. Get medical attention.

SECTION VI - REACTIVITY DATA			
STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	Heat sources, UL Light
INCOMPATABILITY (Materials to avoid) Strong oxidizing agents.			
HAZARDOUS DECOMPOSITION PRODUCTS			
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII - SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED In case of spillage, absorb with inert material and dispose of in accordance with applicable regulations.	
WASTE DISPOSAL METHOD Dispose in accordance with State, Local, Federal Regulations.	

SECTION VIII - SPECIAL PROTECTION INFORMATION		
RESPIRATORY PROTECTION (Specify type) If concentration exceeds TLV, use approved respirator.		
VENTILATION	LOCAL EXHAUST Adequate ventilation should be provided to keep below TLV.	SPECIAL
	MECHANICAL (General) Adequate ventilation should be provided to keep below TLV.	OTHER
PROTECTIVE GLOVES Recommended	EYE PROTECTION Recommended	
OTHER PROTECTIVE EQUIPMENT Emergency eye wash fountains & safety showers should be available in the vicinity of work place.		

SECTION IX - SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING Store away from heat sources and direct sunlight.	
Keep container closed when not in use.	
OTHER PRECAUTIONS Product contains salts of heavy metals. Harmful if swallowed. Launder contaminated clothing before use.	

2/22/85
C.F. / B. / K.

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U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved
OMB No. 44-R1387

MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing,
Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I	
MANUFACTURER'S NAME Providence Chemicals Division, Whittaker Corp.	EMERGENCY TELEPHONE NO. (401) 434-1770
ADDRESS (Number, Street, City, State, and ZIP Code) King Philip Road, East Providence, Rhode Island 02914	
CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS R-8273 Clear Chem-O-Sol
CHEMICAL FAMILY Vinyl Plastisol	FORMULA Proprietary

SECTION II - HAZARDOUS INGREDIENTS					
PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL -		
CATALYST -			ALLOYS -		
VEHICLE -			METALLIC COATINGS (Not Applicable)		
SOLVENTS -			FILLER METAL PLUS COATING OR CORE FLUX -		
ADDITIVES -			OTHERS -		
OTHERS -					
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV (Units)
Organic Salts of Barium, Cadmium and Zinc				less than	2

SECTION III - PHYSICAL DATA			
BOILING POINT (°F.)	N/A	SPECIFIC GRAVITY (H ₂ O=1)	1.07
VAPOR PRESSURE (mm Hg.)	N/A	PERCENT VOLATILE BY VOLUME (%)	Nil
VAPOR DENSITY (AIR=1)	N/A	EVAPORATION RATE (_____ =1)	N/A
SOLUBILITY IN WATER	Nil		
APPEARANCE AND ODOR	Mild Odor, Opaque Liquid		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA							
FLASH POINT (Method used)	410°F. (C.O.C.)	FLAMMABLE LIMITS	<table border="1"> <tr> <th>LeI</th> <th>UeI</th> </tr> <tr> <td></td> <td></td> </tr> </table>	LeI	UeI		
LeI	UeI						
EXTINGUISHING MEDIA CO ₂ , Dry Chemical, Foam, Water Fog							
SPECIAL FIRE FIGHTING PROCEDURES Do not use water jet as frothing may promote flame spread.							
UNUSUAL FIRE AND EXPLOSION HAZARDS May release HCL and CO under extreme heat or when burned.							
Do not inhale smoke or fumes.							

TRW-00453

SECTION V - HEALTH HAZARD DATA	
THRESHOLD LIMIT VALUE N/A	
EFFECTS OF OVEREXPOSURE Eye & Skin Contact: - May cause reddening.	
Ingestion: - May cause diarrhea. Contains salts of heavy metals.	
EMERGENCY AND FIRST AID PROCEDURES Skin Contact: Wash with soap & water.	
Eye Contact: Flush with water for 15 minutes, consult a physician.	
Ingestion: Induce vomiting, consult a physician.	

SECTION VI - REACTIVITY DATA			
STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	
INCOMPATIBILITY (Materials to avoid) Strong oxidizing agents (Acids)			
HAZARDOUS DECOMPOSITION PRODUCTS HCl, CO, CO ₂			
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII - SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	
Cover with absorbent material and collect in a suitable container.	
WASTE DISPOSAL METHOD	
Burial in an approved landfill, or controlled incineration. In accordance with current regulations.	

SECTION VIII - SPECIAL PROTECTION INFORMATION		
RESPIRATORY PROTECTION (Specify type)		
VENTILATION	LOCAL EXHAUST During fusing	SPECIAL
	MECHANICAL (General) During fusing	OTHER
PROTECTIVE GLOVES Recommended		EYE PROTECTION Recommended
OTHER PROTECTIVE EQUIPMENT		

SECTION IX - SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING Store away from direct sunlight & other heat sources. Avoid contact with skin, wash thoroughly after handling. Contains salts of heavy metals.	
OTHER PRECAUTIONS Do not inhale fumes given off during fusing. Exhaust fusing ovens & provide adequate ventilation.	

RECEIVED

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OMB No. 44-R1387

JUN 02 1986

MATERIAL SAFETY DATA SHEET

D. F. BORSUK

Required under USOL Safety and Health Regulations for Ship Repairing,
Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME

Providence Chemicals Division, Whittaker Corporation

EMERGENCY TELEPHONE NO.

(401) 434-1770

ADDRESS (Number, Street, City, State, and ZIP Code)

King Philip Road, East Providence, Rhode Island 02916

CHEMICAL NAME AND SYNONYMS

TRADE NAME AND SYNONYMS

X-7956 Gray Chem-O-Sol

CHEMICAL FAMILY

Vinyl Plastisol

FORMULA

Proprietary

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV (Units)
Salts of Lead Sulfate CAS# 1202-17-4				as Pb	< 1.8 0.05mg/M ³

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	N/A	SPECIFIC GRAVITY (H ₂ O=1)	1.17
VAPOR PRESSURE (mm Hg.)	N/A	PERCENT VOLATILE BY VOLUME (%)	N11
VAPOR DENSITY (AIR=1)	N/A	EVAPORATION RATE (_____ =1)	N/A
SOLUBILITY IN WATER	N11		
APPEARANCE AND ODOR	Gray Liquid - Mild Odor		

TRW-00455

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	Above 200°F.	FLAMMABLE LIMITS	Lim	Uen
EXTINGUISHING MEDIA	CO ₂ , Dry Chemical, Foam, Water Fog			
SPECIAL FIRE FIGHTING PROCEDURES	Do not use water jet as frothing may promote flame spread.			
UNUSUAL FIRE AND EXPLOSION HAZARDS	May release HCl and CO under extreme heat or when burned. Do not inhale smoke or fumes.			

UNCLASSIFIED

SECTION V - HEALTH HAZARD DATA	
THRESHOLD LIMIT VALUE	See Section II
EFFECTS OF OVEREXPOSURE Depending on long-term exposure, symptoms of lead susceptibility include tiredness, decreased appetite, stomach cramps etc...	
EMERGENCY AND FIRST AID PROCEDURES : If swallowed, induce vomiting immediately by giving two glasses of water & sticking finger down the throat. Never give anything by mouth to an unconscious person. Get medical attention. In case of contact, immediately flush eyes and skin with water for 15 minutes.	

SECTION VI - REACTIVITY DATA			
STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	Heat and UV light
INCOMPATIBILITY (Materials to avoid) Strong oxidizing agents			
HAZARDOUS DECOMPOSITION PRODUCTS			
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII - SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Cover with inert material and dispose of in accordance with applicable regulations.	
WASTE DISPOSAL METHOD Dispose in accordance with State, Local, Federal Regulations.	

SECTION VIII - SPECIAL PROTECTION INFORMATION		
RESPIRATORY PROTECTION (Specify type) Respirator recommended if TLV is exceeded.		
VENTILATION	LOCAL EXHAUST Adequate ventilation should be	SPECIAL
	MECHANICAL (General) ensured to keep below TLV.	OTHER
PROTECTIVE GLOVES Recommended		EYE PROTECTION Use of goggles recommended.
OTHER PROTECTIVE EQUIPMENT Emergency eye wash fountains & safety showers should be available in the vicinity of work place.		

SECTION IX - SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING Store away from heat sources and direct sunlight.	
OTHER PRECAUTIONS Do not use on toys, furniture or surface of other articles which might be chewed by children. Wash hands thoroughly after using & before smoking or eating.	

PAGE (2) While the information & recommendations set forth herein are believed to be accurate as of the date hereof, Providence Chemicals Div. makes no warranty with respect thereto & disclaims all liability from reliance thereon.

Form OSHA-20 Rev. May 72

5-29-86

2/22/85
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U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved
OMB No. 44-R1387

MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing,
Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME Providence Chemicals Division, Whittaker Corp.		EMERGENCY TELEPHONE NO. (401) 434-1770
ADDRESS (Number, Street, City, State, and ZIP Code) King Philip Road, East Providence, Rhode Island 02914		
CHEMICAL NAME AND SYNONYMS		TRADE NAME AND SYNONYMS X-9143 Gray Chem-O-Sol
CHEMICAL FAMILY Vinyl Plastisol	FORMULA Proprietary	

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL -		
CATALYST -			ALLOYS -		
VEHICLE -			METALLIC COATINGS (Not Applicable)		
SOLVENTS -			FILLER METAL PLUS COATING OR CORE FLUX -		
ADDITIVES -			OTHERS -		
OTHERS -					
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV (Units)
Inorganic salts of lead less than				2	

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	N/A	SPECIFIC GRAVITY (H ₂ O=1)	1.18
VAPOR PRESSURE (mm Hg.)	N/A	PERCENT VOLATILE BY VOLUME (%)	Nil
VAPOR DENSITY (AIR=1)	N/A	EVAPORATION RATE (_____ =1)	N/A
SOLUBILITY IN WATER	Nil		
APPEARANCE AND ODOR	Mild Odor, Gray Liquid		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used) 410°F. (C.O.C.)	FLAMMABLE LIMITS	LeI	UeI
EXTINGUISHING MEDIA CO ₂ , Dry Chemical, Foam, Water Fog			
SPECIAL FIRE FIGHTING PROCEDURES Do not use water jet as frothing may promote flame spread.			
UNUSUAL FIRE AND EXPLOSION HAZARDS May release HCL and CO under extreme heat or when burned.			
Do not inhale smoke or fumes.			

TRW-00457

SECTION V - HEALTH HAZARD DATA	
THRESHOLD LIMIT VALUE	N/A
EFFECTS OF OVEREXPOSURE	Eye & Skin Contact: - May cause reddening.
	Ingestion: - May cause diarrhea. Contains salts of heavy metals.
EMERGENCY AND FIRST AID PROCEDURES	Skin Contact: Wash with soap & water.
	Eye Contact: Flush with water for 15 minutes, consult a physician.
	Ingestion: Induce vomiting, consult a physician.

SECTION VI - REACTIVITY DATA			
STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	
INCOMPATIBILITY (Materials to avoid) Strong oxidizing agents (Acids)			
HAZARDOUS DECOMPOSITION PRODUCTS HCl, CO, CO ₂			
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII - SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	
Cover with absorbent material and collect in a suitable container.	
WASTE DISPOSAL METHOD	
Burial in an approved landfill, or controlled incineration. In accordance with current regulations.	

SECTION VIII - SPECIAL PROTECTION INFORMATION			
RESPIRATORY PROTECTION (Specify type)			
VENTILATION	LOCAL EXHAUST	SPECIAL	
	MECHANICAL (General)	OTHER	
PROTECTIVE GLOVES Recommended		EYE PROTECTION Recommended	
OTHER PROTECTIVE EQUIPMENT			

SECTION IX - SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING	
Store away from direct sunlight & other heat sources. Avoid contact with skin, wash thoroughly after handling. Contains salts of heavy metals.	
OTHER PRECAUTIONS	
Do not inhale fumes given off during fusing. Exhaust fusing ovens & provide adequate ventilation.	

PAGE (2) While the information & recommendations set forth herein are believed to be accurate as of the date hereof, Providence Chemicals Div. makes no warranty with respect thereto and disclaims all liability from reliance thereon.

GPO 930-540

Form OSHA-20
Rev. May 72

2/18/85

TRW-00458

MATERIAL SAFETY DATA SHEET

PARAFFIN WAX

(Approved by U.S. Department of Labor "Essentially Similar" to Form LSB-00S-4)

Section I

MANUFACTURER'S NAME

Neville Chemical Company

STREET ADDRESS

Neville Island

CITY, STATE, AND ZIP CODE

Pittsburgh, Pennsylvania 15225

EMERGENCY TELEPHONE NO.

Area 412-331-4200

CHEMICAL NAME AND SYNONYMS

CHLORINATED PARAFFIN WAX

CHEMICAL FAMILY

Chlorinated Hydrocarbon

TRADE NAME

UNICHLO 40

PARAFFIN WAX

FORMULA

$C_{22}H_{40}Cl_6$

PAINTS, PRESERVATIVES, & SOLVENTS

PIGMENTS

%

TLV
(Units)

SOLVENTS

%

TLV
(Units)

CATALYST

ADDITIVES

VEHICLE

OTHERS

~~HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES~~

%

TLV
(Units)

Literature references indicate 40% Chlorinated Paraffin to be "non toxic"

Section II - PHYSICAL DATA

BOILING POINT (°F.)

NONE

SPECIFIC GRAVITY (H₂O=1)

1.19 @ 25° C.

VAPOR PRESSURE (mm Hg.)

NA

PERCENT VOLATILE
BY VOLUME (%)

essentially 100%

VAPOR DENSITY (AIR=1)

NA

EVAPORATION RATE
(.....=1)

NA

SOLUBILITY IN WATER

Negligible

Volatility

2.8×10^6 grams/square
centimeter/hour @ 100° C.

APPEARANCE AND ODOOR

Clear Straw Color Liq.

ODOR

Typical - Mild

Section III - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED)

None-(Cleveland Open Cup)

FLAMMABLE LIMITS

LeI

EXTINGUISHING MEDIA

Material is used in fire retardant compounds.

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

0908-1825

TRW-00459

THRESHOLD LIMIT VALUE

N.A.

2. ~~XXXXXXXXXXXX~~

Ingestion - Material is believed sufficiently inert to allow time for physician or hospital treatment.
Eye Contact - Flush - Contact physician

EMERGENCY AND FIRST AID PROCEDURES

Skin contact - Flush with mild solvent and/or soap and water

STABILITY

UNSTABLE

CONDITIONS TO AVOID

STABLE

X

Temperature above 100° C. for extended time periods.

INCOMPATIBILITY (Materials to avoid)

HAZARDOUS DECOMPOSITION PRODUCTS

Hydrogen chloride evolved at high temperatures. At 175° C. for a four hour period 0.25% HCl is generated.

HAZARDOUS
POLYMERIZATION

MAY OCCUR

CONDITIONS TO AVOID

WILL NOT OCCUR

X

3. TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Material should be cleaned up with mild solvent and/or detergent wash.

WASTE DISPOSAL METHOD

Generally in the manner of petroleum products.

RESPIRATORY PROTECTION (Specify type)

VENTILATION

LOCAL EXHAUST

SPECIAL

MECHANICAL (General)

OTHER

PROTECTIVE GLOVES

Neoprene

EYE PROTECTION

Safety Glasses

OTHER PROTECTIVE EQUIPMENT

Volatility at ambient temperatures is very low, however good manufacturing practices dictate the insurance of good ventilation and air movement.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Material should not be heated above 100° C. for extended periods of time. See reactivity data.

OTHER PRECAUTIONS

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration
MATERIAL SAFETY DATA SHEET

Section I

SIC #2842

MANUFACTURER'S NAME

Shield Packaging Co., Inc.

ADDRESS Peter St. Webster, MA 01570

ISSUE DATE: 12/85

EMERGENCY TELEPHONE NUMBER

617-949-0900

CHEMICAL NAME AND SYNONYMS - N/A TRADE NAME - MEYER GAGE CO., INC.
CHLOROTHENE CLEANER

CHEMICAL FAMILY - Mixture

FORMULA - N/A

Section II - HAZARDOUS INGREDIENTS

CAS #	Hazardous Mixtures of liquids, solids, or gases	%	TLV(units)
71-55-6	Ethane, 1,1,1-Trichloro- Syn: 1,1,1-Trichloroethane	96-98	350 ppm (OSHA, ACGIH: 450 ppm STEL)
124-38-9	Carbon Dioxide Syn: Carbonic Acid Gas	2-4	8000 ppm

Section III - PHYSICAL DATA

BOILING POINT (F) - N/A

SPECIFIC GRAVITY (H2O = 1) - Approx. 1.2 @ 25/25 Deg. C.

VAPOR PRESSURE (mm Hg)

% VOLATILE BY VOLUME - Essent. 100 %

Not > 90 psig @ 70 degrees F.

VAPOR DENSITY (AIR=1) Approx. 4.0

EVAPORATION RATE (Butyl Acetate =1) < 1 slower

APPEARANCE AND ODOR - Colorless Aerosol, Irritating odor at high concentrations

SOLUBILITY IN WATER - Not > 0.07g/100g @ 25 degrees C.

Section IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (method used) -
None (TOC, TCC, COC)

FLAMMABLE LIMITS
@ 25 degrees C.

Lel
6%

Uel
16.7

EXTINGUISHING MEDIA - Water fog, chemical foam.

SPECIAL FIRE FIGHTING PROCEDURES - Self contained breathing apparatus. Cool uninvolved cans to prevent possible bursting.

UNUSUAL FIRE AND EXPLOSION HAZARDS-

Excessive heat may tend to thermally degrade materials. See Section VI

Section V - Health Hazard Data

THRESHOLD LIMIT VALUE - N/E for product. See Section II for component TLV's

EFFECTS OF OVEREXPOSURE :

EYES: Acute pain with slight transient irritation and slight transient corneal injury.

SKIN: Transient irritation possible with drying or flaking of skin on repeated or prolonged contact.

INGESTION: Not likely to be ingested in acutely toxic amounts. If aspirated liquid may be rapidly absorbed causing injury to other body systems.

INHALATION: Anesthetic or Narcotic effects to dizziness, drunkenness as vapor concentrations increase. In poorly or non ventilated areas vapors may readily collect and cause unconsciousness or be fatal.

EMERGENCY AND FIRST AID PROCEDURES :

EYES: Wash with large amounts of tempered water. If irritation develops or persist consult physician.

SKIN: Wash off with mild soap and water. If irritation develops or persist consult physician.

INGESTION: Do not induce vomiting. Seek immediate medical attention.

INHALATION: Remove to fresh air. If breathing has ceased give artificial respiration. Seek immediate medical attention.

Section VI- REACTIVITY DATA

STABILITY - Stable

CONDITIONS TO AVOID - Excessively high temperatures that will tend to decompose materials (Welding arcs, etc.)

INCOMPATIBILITY - (materials to avoid)- Avoid prolonged contact with or storage in aluminum or its alloys. (Metallic aluminum, Zinc Powder, etc.)

HAZARDOUS DECOMPOSITION PRODUCTS - Thermal (heat) deterioration may produce Hydrogen Chloride and very small amounts of Phosgene and Chlorine.

HAZARDOUS POLYMERIZATION - Will NOT Occur.

CONDITIONS TO AVOID - None Known

Section VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED - Small spills: mop or wipe up. Remove to out of doors. Large spills: Ventilate area. Contain liquid and transfer to steel drums. Cap tightly.

WASTE DISPOSAL METHOD - Dispose of in accordance with Federal, State and Local Regulations.

Section VIII-SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (specify type) :

VENTILATION - Use only in well ventilated area.

LOCAL EXHAUST - To keep vapor concentrations below TLV

MECHANICAL - In low lying or confined areas where vapors may accumulate.

PROTECTIVE GLOVES - Where repeated or prolonged contact is expected with material.

OTHER PROTECTIVE EQUIPMENT - N/A

Section IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE - Store in a cool, dry area, away from direct sunlight. Do not puncture or incinerate can.

OTHER PRECAUTIONS - Read label precautions thoroughly before use. Use only as directed. Avoid spraying on skin or into face or eyes. KEEP FROM REACH OF CHILDREN

TRW-00462

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MATERIAL SAFETY DATA SHEET

Dow Chemical U.S.A.* Midland, MI 48674 Emergency Phone: 517-636-4400

Product Code: 16896

Page: 1

PRODUCT NAME: CHLOROTHENE (R) SM SOLVENT

Effective Date: 05/12/89 Date Printed: 05/23/89

MSDS:001111

1. INGREDIENTS: (% w/w, unless otherwise noted)

1,1,1-Trichloroethane	CAS# 000071-55-6	96.5% (wt.)
Diethylene Ether (1,4-Dioxane)	CAS# 000123-91-1	2.5
1,2-Butylene oxide	CAS# 000106-88-7	0.47
Nitromethane	CAS# 000075-52-5	0.34

The hazard information presented is based on tests conducted on this or similar mixtures. Therefore, pursuant to the OSHA Hazard Communication Standard (see 29 CFR Part 1910.1200 (g) (2) (b)), the information is based on the tested mixture and not individual ingredients.

2. PHYSICAL DATA:

BOILING POINT: 165F (74C)
VAP PRESS: 100 mmHg @ 20C
VAP DENSITY: 4.55
SOL. IN WATER: 0.07 g/100g @ 25C
SP. GRAVITY: 1.321 @ 25/25C
APPEARANCE: Colorless liquid.
ODOR: Irritating odor at high concentrations.

3. FIRE AND EXPLOSION HAZARD DATA:

FLASH POINT: None
METHOD USED: TOC, TCC, COC

FLAMMABLE LIMITS
LFL: 7.5% @ 25C
UFL: 12.5% @ 25C

EXTINGUISHING MEDIA: Water fog.

FIRE & EXPLOSION HAZARDS: Vapors of this solvent may develop a flammable atmosphere in confined or poorly-ventilated areas.

(Continued on Page 2)

(R) Indicates a Trademark of The Dow Chemical Company

* An Operating Unit of The Dow Chemical Company

0908-1829

TRW-00463

M A T E R I A L S A F E T Y D A T A S H E E T

Dow Chemical U.S.A.* Midland, MI 48674 Emergency Phone: 517-636-4400

Product Code: 16896

Page: 2

PRODUCT NAME: CHLOROTHENE (R) SM SOLVENT

Effective Date: 05/12/89 Date Printed: 05/23/89

MSDS:001111

3. FIRE AND EXPLOSION HAZARD DATA: (CONTINUED)

FIRE-FIGHTING EQUIPMENT: Wear positive pressure, self-contained breathing apparatus.

4. REACTIVITY DATA:

STABILITY: (CONDITIONS TO AVOID) Avoid open flames, welding arcs or other high temperature sources which induce thermal decomposition.

INCOMPATIBILITY: (SPECIFIC MATERIALS TO AVOID) Prolonged contact with free water may result in corrosion and diminished stabilizer levels. Prolonged contact with, or storage in aluminum, its alloys, and particularly metallic aluminum and zinc powders should be avoided. These reactive metals can cause hydrochloric acid gas to form and, if confined as in an aerosol can or pump, the gas pressure may rupture the container.

HAZARDOUS DECOMPOSITION PRODUCTS: Hydrogen chloride and very small amounts of phosgene and chlorine.

HAZARDOUS POLYMERIZATION: Will not occur.

5. ENVIRONMENTAL AND DISPOSAL INFORMATION:

ACTION TO TAKE FOR SPILLS/LEAKS: Small leaks: Mop up, wipe up, or soak up immediately. Remove to out-of-doors.
Large spills: Evacuate area. Contain liquid; transfer to closed metal containers. Keep out of water supplies.

DISPOSAL METHOD: When disposing of the unused contents, the preferred options are to send to licensed reclaimer, or to permitted incinerators. Any disposal practice must be in compliance with federal, state, and local regulations. Do not dump into sewers, on the ground, or into any body of water.

(Continued on Page 3)

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M A T E R I A L S A F E T Y D A T A S H E E T

Dow Chemical U.S.A.* Midland, MI 48674 Emergency Phone: 517-636-4400

Product Code: 16896

Page: 3

PRODUCT NAME: CHLOROTHENE (R) SM SOLVENT

Effective Date: 05/12/89 Date Printed: 05/23/89

MSDS:001111

6. HEALTH HAZARD DATA:

EYE: May cause pain. May cause slight transient (temporary) irritation with slight transient corneal injury. Vapors may irritate eyes.

SKIN CONTACT: Prolonged or repeated exposure may cause skin irritation. Repeated contact may cause drying or flaking of skin.

SKIN ABSORPTION: A single prolonged skin exposure is not likely to result in absorption of harmful amounts. The LD50 for rabbits is about 15,000 mg/kg.

INGESTION: Single dose oral toxicity is low. The LD50 for rats is >10,000 mg/kg. If aspirated (liquid enters the lung), may be rapidly absorbed through the lungs and result in injury to other body systems.

INHALATION: Minimal anesthetic or narcotic effects may be seen in the range of 500-1000 ppm trichloroethane. Progressively higher levels over 1000 ppm may cause dizziness, drunkenness; concentrations as low as 10,000 ppm can cause unconsciousness and death. These high levels may also cause cardiac arrhythmias (irregular heartbeats). In confined or poorly ventilated areas, vapors which readily accumulate can cause unconsciousness and death.

SYSTEMIC & OTHER EFFECTS: Based on available data, repeated exposures are not anticipated to cause any significant adverse effects. The formulation containing 1,1,1-trichloroethane, 1,4-dioxane, 1,2-butylene oxide, and nitromethane was tested in long-term animal studies and did not cause cancer. Birth defects are unlikely. Exposures having no adverse effects on the mother should have no effect on the fetus. In animal studies, has been shown not to interfere with reproduction. Results of in vitro (test tube) mutagenicity tests have been negative. Results of mutagenicity tests in animals have been negative.

(Continued on Page 4)

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M A T E R I A L S A F E T Y D A T A S H E E T

Dow Chemical U.S.A.* Midland, MI 48674 Emergency Phone: 517-636-4400

Product Code: 16896

Page: 4

PRODUCT NAME: CHLOROTHENE (R) SM SOLVENT

Effective Date: 05/12/89 Date Printed: 05/23/89

MSDS:001111

7. FIRST AID:

EYES: Irrigate immediately with water for at least 5 minutes.

SKIN: Wash off in flowing water or shower.

INGESTION: Do not induce vomiting. Call a physician and/or transport to emergency facility immediately.

INHALATION: Remove to fresh air. If not breathing, give mouth-to-mouth resuscitation. If breathing is difficult, give oxygen. Call a physician.

NOTE TO PHYSICIAN: Because rapid absorption may occur through lungs if aspirated and cause systemic effects, the decision of whether to induce vomiting or not should be made by an attending physician. If lavage is performed, suggest endotracheal and/or esophageal control. Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach. Exposure may increase "myocardial irritability." Do not administer sympathomimetic drugs unless absolutely necessary. No specific antidote. Supportive care. Treatment based on judgment of the physician in response to reactions of the patient.

8. HANDLING PRECAUTIONS:

EXPOSURE GUIDELINE(S): 1,1,1-Trichloroethane (methyl chloroform): OSHA PEL and ACGIH TLV are 350 ppm TWA, 450 ppm STEL. Dioxone (diethylene ether): OSHA PEL and ACGIH TLV are 25 ppm, Skin.

ACGIH TLV is 25 ppm (skin) for diethylene ether. OSHA PEL is 100 ppm (skin) for diethylene ether. Dow Industrial Hygiene Guide for 1,2-butylene oxide is 40 ppm (excursion 100 ppm). ACGIH TLV and OSHA PEL for nitromethane is 100 ppm.

VENTILATION: Control airborne concentrations below the exposure guideline. Use only with adequate ventilation. Local exhaust ventilation may be necessary for some operations. Lethal

(Continued on Page 5)

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M A T E R I A L S A F E T Y D A T A S H E E T

Dow Chemical U.S.A.* Midland, MI 48674 Emergency Phone: 517-636-4400

Product Code: 16896

Page: 5

PRODUCT NAME: CHLOROTHENE (R) SM SOLVENT

Effective Date: 05/12/89 Date Printed: 05/23/89

MSDS:001111

8. HANDLING PRECAUTIONS: (CONTINUED)

concentrations may exist in areas with poor ventilation.

RESPIRATORY PROTECTION: Atmospheric levels should be maintained below the exposure guideline. When respiratory protection is required for certain operations, use an approved air-purifying respirator. For emergency and other conditions where the exposure guideline may be greatly exceeded, use an approved positive pressure self-contained breathing apparatus. In confined or poorly ventilated areas, use an approved positive pressure self-contained breathing apparatus.

SKIN PROTECTION: For brief contact, no precautions other than clean body-covering clothing should be needed. When prolonged or frequently repeated contact could occur, use protective clothing impervious to this material. Selection of specific

items such as gloves, boots, apron, or full body suit will depend on operation.

EYE PROTECTION: Use safety glasses. Where contact with liquid is likely, chemical goggles are recommended because eye contact with this material may cause discomfort, even though it is unlikely to cause injury.

9. ADDITIONAL INFORMATION:

REGULATORY REQUIREMENTS:

SARA HAZARD CATEGORY: This product has been reviewed according to the EPA 'Hazard Categories' promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

An immediate health hazard

SPECIAL PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Handle

(Continued on Page 6)

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TRW-00467

0908-1833

M A T E R I A L S A F E T Y D A T A S H E E T

Dow Chemical U.S.A.* Midland, MI 48674 Emergency Phone: 517-636-4400

Product Code: 16896

Page: 6

PRODUCT NAME: CHLOROTHENE (R) SM SOLVENT

Effective Date: 05/12/89 Date Printed: 05/23/89

MSDS:001111

9. ADDITIONAL INFORMATION: (CONTINUED)

with reasonable care. Avoid breathing vapors. Store in a cool dry place. Concentrated vapors of this product are heavier than air and will collect in low areas such as pits, degreasers, storage tanks, and other confined areas. Do not enter areas where vapors of this product are suspected unless special breathing apparatus is used and an observer is present for assistance.

1,1,1-Trichloroethane products should not be packaged in aluminum aerosol cans or with finely divided aluminum or its alloys in an aerosol can.

Aluminum is not an acceptable material of construction for pumps, mixers, fittings, storage tanks for 1,1,1-trichloroethane products or formulations. Metallic aluminum and zinc powders should be avoided.

MSDS STATUS: Revised Section 8.

SARA 313 INFORMATION:

This product contains the following substances subject to the reporting requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372:

CHEMICAL NAME	CAS NUMBER	CONCENTRATION
1,1,1-TRICHLOROETHANE (METHYL CHLOROFORM	000071-55-6	96.5 %
1,4-DIOXANE	000123-91-1	2.5 %

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The Information Herein is Given in Good Faith, But No Warranty,
Express Or Implied, is Made. Consult The Dow Chemical Company
For Further Information.

* An Operating Unit of The Dow Chemical Company

Man-GILL CHEMICAL COMPANY

23000 ST. CLAIR AVE. • CLEVELAND, OHIO 44117 • 216 - 486-5300 • CHEMTREC 800 - 424-9300

**MATERIAL SAFETY DATA SHEET**

07860

Section I

Identity	Date Prepared	02/25/86	Date Revised	12/09/85
CHROME OXIDE GREEN	NFPA CODE HEALTH	2	FLAMMABILITY	1
			REACTIVITY	1

Section II — Hazardous Ingredients

Hazardous Ingredients	CAS #	Health Hazards	ACGIH TLV - TWA
PROPYLENE GLYCOL	107-98-2		350 MG/CUM
NO COMPONENT WAS FOUND TO BE CARCINOGENIC IN NTP, IARC OR OSHA 1910(Z)			

Section III — Physical/Chemical Characteristics

Boiling Point	369 DEG F	Specific Gravity (H ₂ O = 1)	2.12
Vapor Pressure (mm Hg)	NOT DETERMINED	Percent Volatile By Volume (%)	46
Vapor Density (AIR = Reference)	HEAVIER	Evaporation Rate (Ether = Reference)	SLOWER
Water Soluble	NO		
Appearance and Odor	GREEN LIQUID, MILD ODOR		

Section IV — Fire and Explosion Hazard Data

Flash Point (Method Used)	214 DEG T TCC	Flammable Limits	LEL	UEL
		LOWEST VALUE	2.6	
Extinguishing Media	CARBON DIOXIDE, DRY CHEMICAL.			
Special Fire Fighting Procedures	IF EXPOSED TO HEAT, PRESSURE WILL BUILD UP CONTAINER.			
Unusual Fire and Explosion Hazards	A STRAIGHT WATER STREAM WOULD SPREAD FIRES. STATIC ELECTRICITY COULD CAUSE IGNITION.			

TRW-00469

MAN-GILL CHEMICAL COMPANY

MATERIAL SAFETY DATA SHEET

CHROME OXIDE GREEN

07860

Section V — Reactivity Data

STABILITY	Unstable Stable *	Conditions to Avoid AVOID PROLONGED STORAGE AT ELEVATED TEMPERATURES.
INCOMPATIBILITY (Materials to Avoid) NONE KNOWN		
Hazardous Decomposition Products OXIDES OF CARBON		
HAZARDOUS POLYMERIZATION	May Occur Will Not Occur *	Conditions to Avoid NONE

Section VI — Health Hazard Data

Effects of Overexposure	MILD SKIN IRRITANT. HARMFUL IF SWALLOWED. IRRITATING TO THE EYES. INHALATION MAY CAUSE HEADACHE, NAUSEA, AND DIZZINESS.
Emergency and First Aid Procedures	
Eye (Contact):	FLUSH EYES WITH COPIOUS AMOUNTS OF WATER FOR 15 MINUTES AND CONTACT PHYSICIAN IMMEDIATELY.
Skin (Contact):	WASH WITH SOAP AND WATER. CONTACT PHYSICIAN IF IRRITATION PERSISTS.
Ingestion (Swallowing):	DRINK LARGE QUANTITIES OF MILK OR WATER. CONSULT PHYSICIAN IMMEDIATELY.
Inhalation (Breathing):	REMOVE TO FRESH AIR.

Section VII — Precautions for Safe Handling & Use

Steps to be taken in Case Material is Released or Spilled	CONTAIN SPILL. ABSORB AND DISPOSE WASTE.
Waste Disposal Method:	DISPOSE IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS.
Precautions To be Taken in Handling and Storage	DO NOT STORE OR USE NEAR HEAT, SPARKS, OR FLAME. DO NOT STORE NEAR COMBUSTIBLE MATERIAL. DO NOT STORE IN DIRECT SUNLIGHT. WHEN SANDING DRY FILM, USE NIOSH APPROVED DUST MASK. KEEP CONTAINER TIGHTLY CLOSED WHEN NOT IN USE.
Other Precautions:	SHOWERS AND EYE WASH FOUNTAINS SHOULD BE MADE AVAILABLE WHERE CHEMICALS ARE USED.

Section VIII — Control Measures

Respiratory Protection (Specify Type)		USE NIOSH APPROVED EQUIPMENT WHEN AIRBORNE EXPOSURE LIMITS ARE EXCEEDED.
Ventilation	Local Mechanical	RECOMMENDED TO MAINTAIN BELOW TLV
Protective Gloves	NEOPRENE RUBBER	Eye Protection SPLASH GOGGLES OR FACE SHIELD
Other Protective Clothing or Equipment PROTECTIVE CLOTHING SUFFICIENT TO PREVENT SKIN CONTACT.		
Work/Hygienic Practices WASH THOROUGHLY BEFORE EATING, SMOKING OR USING TOILET FACILITIES.		

THE INFORMATION PRESENTED HEREIN HAS BEEN COMPILED FROM SOURCES CONSIDERED TO BE DEPENDABLE AND IS ACCURATE TO THE BEST OF SELLER'S KNOWLEDGE, HOWEVER, SELLER MAKES NO WARRANTY WHATSOEVER, EXPRESSED, IMPLIED OR OF MERCHANTABILITY REGARDING THE ACCURACY OF SUCH DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF. SELLER ASSUMES NO RESPONSIBILITY FOR INJURY TO BUYER OR TO THIRD PERSONS OR FOR ANY DAMAGE TO ANY PROPERTY AND BUYER ASSUMES ALL SUCH RISK.

TRW-00470

ATTN:

TRANE

Occupational Safety and Health Administration

MATERIAL SAFETY DATA SHEET

CC: [REDACTED] Injunct under USDL Safety and Health Regulations for Ship Repairing,
CUSTOMER SERVICE. Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME TRW FASTENERS DIVISION		EMERGENCY TELEPHONE NO. (201) 233-3300 X830
ADDRESS (Number, Street, City, State, and ZIP Code) GLEN ROAD, MOUNTAINSIDE, NEW JERSEY 07092		
CHEMICAL NAME AND SYNONYMS		TRADE NAME AND SYNONYMS
CHEMICAL FAMILY Metals fasteners treated with chromic acid	FORMULA Chromic Acid CrO_3	

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Unit)	ALLOYS AND METALLIC COATINGS	%	TLV (Unit)
MOMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV (Unit)
Chromic Acid as solid					0.1 mg/m ³

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	387 decomposes	SPECIFIC GRAVITY (H ₂ O=1)	2.7
VAPOR PRESSURE (mm.)	NA	PERCENT VOLATILE BY VOLUME (%)	NA
VAPOR DENSITY (A.R.=1)	NA	EVAPORATION RATE (_____ °F)	NA
SOLUBILITY IN WATER	Soluble		
APPEARANCE AND ODOR	NA		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Meissner VMO)	FLAMMABLE LIMITS	LEL	UEL
EXTINGUISHING MEDIA			
SPECIAL FIRE FIGHTING PROCEDURES	NA	0908-1837	TRW-00471

Chromic acid

(2)

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

EFFECTS OF OVEREXPOSURE

May cause skin sensitization and dermatitis. Also eye irritation,

when touched with contaminated hands. Chromic acid splash causes permanent eye injury.

EMERGENCY AND FIRST AID PROCEDURES

SECTION VI - REACTIVITY DATA

STABILITY

UNSTABLE

NA

CONDITIONS TO AVOID

STABLE

NA

INCOMPATIBILITY (Materials to avoid)

HAZARDOUS DECOMPOSITION PRODUCTS

None

HAZARDOUS
POLYMERIZATION

MAY OCCUR

NA

CONDITIONS TO AVOID

WILL NOT OCCUR

NA

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

NA

WASTE DISPOSAL METHOD

Use non-combustible containers.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)

None, if breathing airborne levels are below 0.05 mg/m³

VENTILATION

LOCAL EXHAUST

SPECIAL

MECHANICAL (General)

OTHER

PROTECTIVE GLOVES

Polyvinyl chloride type gloves

EYE PROTECTION

Safety glasses

OTHER PROTECTIVE EQUIPMENT

Protective outer clothing. Avoid skin contact.

SECTION IX - SPECIAL PRECAUTIONS

TRW-00472

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Employees should wash hands frequently with soap and water, especially before eating, smoki

or using toilet facilities. Avoid skin contact.

OTHER PRECAUTIONS

0908-1838

PRODUCT NAME

Comtra No. SC-000-019

Refer to Material Safety Data Sheet for more information.



MANUFACTURER

HITCHINER

MANUFACTURING CO., INC.

MILFORD, NEW HAMPSHIRE 03055

FIRE HAZARD

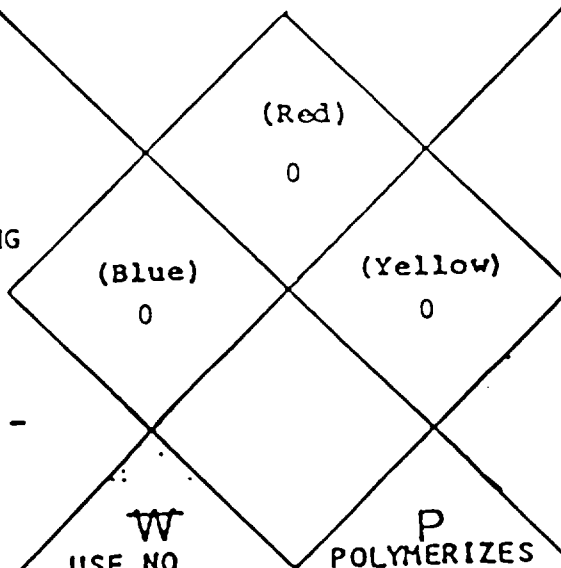
4. EXTREMELY DANGEROUS FIRE AND EXPLOSION HAZARD
3. FIRE AND EXPLOSION HAZARD AT NORMAL TEMP
2. WILL BURN AT TEMPS ABOVE 100 F
1. WILL BURN AT TEMPS ABOVE 200 F
0. WILL NOT BURN

HEALTH
HAZARD

4. EXTREME HAZARD - AVOID CONTACT OR BREATHING VAPOR
3. SEVERE HAZARD - USE SPECIAL CLOTHING AND MASKS
2. HAZARDOUS - USE MASKS OR SPECIAL VENTILATION
1. SLIGHTLY HAZARDOUS - IRRITATING
0. NORMAL MATERIAL

REACTIVITY
HAZARD

4. EXTREME HAZARD - VACATE AREA IN CASE OF FIRE
3. SEVERE EXPLOSION HAZARD
2. VIOLENT CHEMICAL CHANGE POSSIBLE
1. UNSTABLE IF HEATED
0. NORMALLY STABLE



ANSI: WARNING! WELDING, CUTTING
OR GRINDING ON THIS CASTING WILL
GENERATE TOXIC DUST OR FUMES.

INGREDIENTS	(PERCENT)
Chromium	0.75 - 10.0
Iron	Balance
Manganese	0.30 - 14.0

See Material Safety Data Sheet for
a listing of minor ingredients.

STORAGE AND HANDLING

No Special Precautions

TRW-00473

MATERIAL SAFETY DATA SHEET (MSDS)
SC-000-019 REV. 1 DATE 11/22/85 CODE 06-04
CONFORMS TO REQUIREMENTS OF OSHA STANDARD 1910.1200
"HAZARD COMMUNICATION" AND TO VARIOUS STATE
"EMPLOYEE RIGHT TO KNOW" LAWS

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SECTION I PRODUCT IDENTIFICATION

This MSDS supplied for: **Chromium Alloyed Steel Castings**

<u>ASTM No.</u>	<u>ACI alloy designation (Grades)</u>
A128/128M-84	C
A217/A217M-84	WC6, WC9, WC11, C5, C12
A356/A356M-84	6, 8, 9, 10
A389/A389M-84	C23, C24
A426-80	CP5, CP5b, CP7, CP9, CP11, CP12 CP21, CP22
A487/A487M-84	8N, 9N, 8Q, 9Q,
A597/A597M-84	CA-2, CH-12, CH-13, C0-1
A732/A732M-84	7Q, 8Q, 12Q, 15A
A757/A757M-84	D1N1, D1Q1, D1N2, D1Q2, D1N3, D1Q3
MIL-S-15464B (SHIPS)	1, 2, 3

=====

VENDOR NAME AND ADDRESS:



HITCHINER

MANUFACTURING CO., INC.

MILFORD, NEW HAMPSHIRE 03055

TELEPHONE (603) 673-1100 FAX (603) 666-1863

TELEX 953014 CABLE ADDRESS HITCHINER

EMERGENCY PHONE NUMBER:

FIRE HAZARD CLASS: HEALTH: 0 FIRE: 0 REACTIVITY: 0
THE FOURTH DIAMOND:

ANSI: WARNING! WELDING, CUTTING, OR GRINDING ON THIS CASTING WILL
GENERATE TOXIC DUST OR FUMES.

TRW-00474

0908-1840

=====

N/E means none established. N/A means not applicable.
N/D means no data available.

 SECTION II - HAZARDOUS COMPONENTS

<u>INGREDIENT</u>	<u>CAS NO.</u>	<u>PERCENT</u>	<u>TLV</u>	<u>PEL</u>
Carbon	7440-44-0	0.20-1.35	N/E	N/E
Chromium	7440-47-3	0.75-10.0	0.5 mg/cu.m	1 mg/cu.m
Chromium (VI)* (certain insoluble forms)			0.05 mg/cu.m	N/E
Copper (As dust)	7440-50-8	0-0.50	1.0 mg/cu.m	1.0 mg/cu.m
(As fume)			0.2 mg/cu.m	0.1 mg/cu.m
Iron (As fume)	7439-89-6	balance	5 mg/cu.m	10 mg/cu.m
Manganese (As dust)	7439-96-5	0.30-14.0	C 5 mg/cu.m	C 5 mg/cu.m
(As fume)			1 mg/cu.m	C 5 mg/cu.m
Molybdenum	7439-98-7	0-1.75	10 mg/cu.m	15 mg/cu.m
Nickel	7440-02-0	0-0.50	1 mg/cu.m	1 mg/cu.m
Phosphorus	7723-14-0	0.025-0.07	0.1 mg/cu.m	0.1 mg/cu.m
Silicon	7440-21-3	0.20-2.00	10 mg/cu.m	15 mg/cu.m
			(as nuisance dust)	
Sulfur	7704-34-9	0.025-1.00	N/E	N/E
Tungsten	7440-33-7	0-1.70	5 mg/cu.m	N/E
Vanadium		0-1.20		
(as vanadium oxide)	1314-62-1			
(As dust)			0.05 mg/cu.m	0.5 mg/cu.m
(As fume)			0.05 mg/cu.m	0.1 mg/cu.m

C means ceiling limit. These are limits which should not be exceeded, even for a short time. All other are 8 hr Time-weighted average concentrations.

Elements having a listed percentage greater than zero will be present in all grades. Those having a value of "0" may not be present in certain grades. Refer to Steel Founders' Society of America "Steel Castings Handbook" Supplement 2 for specifications on a particular ASTM alloy and grade.

* Water insoluble hexavalent chromium is classified as a human carcinogen by the American Conference of Governmental Industrial Hygienists (ACGIH). Approximately 66% of the total chromium in welding fume is hexavalent, and only 5% of that is insoluble. Overexposure to hexavalent chromium is not likely if general welding fume is controlled. (The alloy and its dust does not contain insoluble hexavalent chromium.)

 SECTION III - OVERVIEW

There are no chemical hazards from these castings in solid form at room temperature.

Dust or fumes are generated by machining, grinding, or welding on these castings. Since the castings contain a high percentage of iron, most of the dust or fume will be iron or iron oxide. There is no TLV for iron dust, but available information indicates that a concentration of 10 mg/cu.m., as if it were a nuisance dust, will serve as a guideline until a TLV is established.

TRW-00475

=====

N/E means none established.

N/A means not applicable.

N/D means no data available.

Overexposure to iron oxide fume over a long time can cause siderosis, sometimes called "iron pigmentation" of the lung. It can be seen on a chest x-ray but causes little or no disability. Also see the Material Safety Data Sheet for the welding rod being used.

Since these castings contain up to 10 percent chromium, airborne contaminants from machining or welding will contain chromium dust or fume. If total welding fume is adequately controlled, chromium will also be controlled.

Welding or flame cutting may convert a small fraction of the chromium to the water insoluble hexavalent (carcinogenic) form.

These casting contain up to 0.5% nickel. Some forms of nickel have been found to cause cancer in animals. One form, nickel subsulfide, which was present in an old smelting process no longer used, apparently caused nasal cancer in humans. Since then, studies have shown that the potential for ordinary forms of nickel and its oxides to cause cancer in humans is very weak, if it exists at all.

Some grades contain moderate levels of manganese. Long term overexposure to manganese dust or fume can cause manganese poisoning. If welding or flame cutting fume is controlled to the TLV for total fume, the manganese fume will also be controlled.

Grinding on castings that have not been cleaned or that contain embedded sand may generate significant amounts of dust containing free silica, which can cause silicosis.

Carbon, copper, molybdenum, phosphorus, silicon, sulfur, tungsten, and vanadium are also contained in the castings in low amounts. Overexposure to these would not be likely. If airborne concentrations of total dust and fume are controlled to levels below their respective TLVs and PELs, these minor constituents would also be adequately controlled.

SECTION IV - PHYSICAL DATA

PHYSICAL DESCRIPTION: Solid, silver gray in color, no odor

BOILING POINT: variable depending on casting grade

VAPOR PRESSURE: N/A

VAPOR DENSITY: N/A

SOLUBILITY IN WATER: N/A

SPECIFIC GRAVITY: 7.86 for iron

PERCENT VOLATILE BY VOLUME: N/A

EVAPORATION RATE: N/A

SECTION V - FIRE AND EXPLOSION DATA

Castings will not burn or explode.

TRW-00476

=====

N/A means not applicable.

N/D means no data available.

0908-1842

SECTION VI - HEALTH HAZARD DATA

EYES: Metal particles in the eyes may cause irritation if not removed.

SKIN: None known.

BREATHING: Prolonged or repeated overexposure to iron oxide produced in grinding or welding may cause siderosis. Overexposure to manganese dust can cause manganism. Symptoms of manganism are sleepiness, weakness in the legs, emotional disturbances, uncontrollable laughter, and spastic gait. Breathing excessive amounts of silica dust for a long time can cause silicosis. Silicosis causes shortness of breath, reduced capacity to do work, and weakens the defenses against other lung diseases.

SWALLOWING: N/A

NOISE: Grinding or machining castings is noisy. The OSHA limit for noise averaged over 8 hours is 90 decibels (dBA), hearing conservation program required if exposure is over 85 dBA. If noise is at or above 90 dBA you should wear ear muffs or ear plugs.

===== FIRST AID =====
IF IN EYES: Metal particles should be removed by trained individuals such as a nurse or physician.

IF ON SKIN: N/A

IF BREATHED: (Fumes from welding): Move to fresh air.

IF SWALLOWED: N/A

SECTION VII - REACTIVITY DATA

HAZARDOUS POLYMERIZATION: Will not occur.

STABILITY: Stable.

INCOMPATIBILITY: Chromium metal dust may burn or explode when in contact with ammonium nitrate.

SECTION VIII - SPILL OR LEAK PROCEDURES
-----STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:

If damaged, return castings to vendor or send to scrap reclaimer.

Collected dust from machining, welding, etc. may be classed as a "hazardous waste" depending on circumstances. Consult local authorities regarding disposal.

SECTION IX - PROTECTIVE EQUIPMENT TO BE USED

TRW-00477

RESPIRATORY PROTECTION: Wear a NIOSH approved respirator for dusts or fume if concentrations exceed the TLV or PEL.

VENTILATION: Provide general ventilation and/or local exhaust if necessary to maintain concentrations below the TLVs.

PROTECTIVE GLOVES: Work gloves advisable for handling castings.

EYE PROTECTION: Safety glasses with side shields and/or face shields for particles (grinding). Welding goggles or helmet for welding.

OTHER PROTECTIVE EQUIPMENT: Wear a protective apron and gauntlets if arc-air gouging or cutting, or welding on castings.

If noise is at or above 90 dBA you should wear ear muffs or ear plugs.

=====

N/E means none established.

N/A means not applicable.

N/D means no data available.

SECTION X - SPECIAL PRECAUTIONS OR OTHER COMMENTS

STORAGE: No special precautions.

INFORMATION PRESENTED HEREIN HAS BEEN COMPILED FROM SOURCES
CONSIDERED TO BE RELIABLE AND IS ACCURATE AND RELIABLE TO THE
BEST OF OUR KNOWLEDGE AND BELIEF BUT IS NOT GUARANTEED TO BE SO.

TRW-00478

=====
N/E means none established. N/A means not applicable.
N/D means no data available.

0908-1844

PRODUCT NAME

Comtra No. S C-000-029

Refer to Material Safety Data Sheet for more information.

MANUFACTURER
HITCHINERMANUFACTURING CO., INC.
MILFORD, NEW HAMPSHIRE 03055

FIRE HAZARD

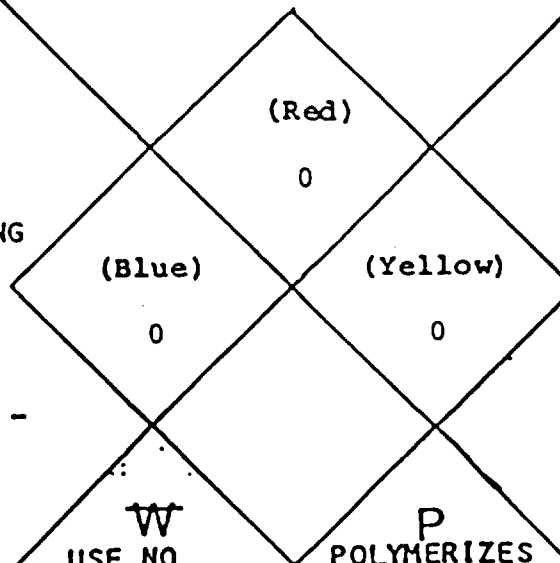
4. EXTREMELY DANGEROUS FIRE AND EXPLOSION HAZARD
3. FIRE AND EXPLOSION HAZARD AT NORMAL TEMP
2. WILL BURN AT TEMPS ABOVE 100 F
1. WILL BURN AT TEMPS ABOVE 200 F
0. WILL NOT BURN

HEALTH
HAZARD

4. EXTREME HAZARD - AVOID CONTACT OR BREATHING VAPOR
3. SEVERE HAZARD - USE SPECIAL CLOTHING AND MASKS
2. HAZARDOUS - USE MASKS OR SPECIAL VENTILATION
1. SLIGHTLY HAZARDOUS - IRRITATING
0. NORMAL MATERIAL

REACTIVITY
HAZARD

4. EXTREME HAZARD - VACATE AREA IN CASE OF FIRE
3. SEVERE EXPLOSION HAZARD
2. VIOLENT CHEMICAL CHANGE POSSIBLE
1. UNSTABLE IF HEATED
0. NORMALLY STABLE



ANSI: WARNING! WELDING, CUTTING OR GRINDING ON THIS CASTING WILL GENERATE TOXIC DUST OR FUMES.

INGREDIENTS (PERCENT)

Chromium	11.5 - 30.0
Iron	Balance
Nickel	0 - 9.0

See Material Safety Data Sheet for a listing of minor ingredients.

STORAGE AND HANDLING

No Special Precautions

MATERIAL SAFETY DATA SHEET (MSDS)
SC-000-029 REV. 1 DATE 11/22/85 CODE 06-04
CONFORMS TO REQUIREMENTS OF OSHA STANDARD 1910.1200
"HAZARD COMMUNICATION" AND TO VARIOUS STATE
"EMPLOYEE RIGHT TO KNOW" LAWS

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SECTION I PRODUCT IDENTIFICATION

This MSDS supplied for: Chromium Based Steel Castings

<u>ASTM No.</u>	<u>ACI alloy designation (Grades)</u>
A217/A217M-84	CA-15
A297/A297M-84	HC, HD
A351/A351M-84	CF10SMnN
A352/A352M-84	CA6NM
A356/A356M-84	CA 6NM
A426-80	CPCA15
A487/A487M-84	CA 6NM, CA 15M, CA 15a, CA 15
A597/A597M-84	CD-2, CD-5
A608-79	HC30, HD50
A743/A743M-84	CA-15, CA-15M, CB-30, CC-50, CA-40 CF10SMnN, CA-6NM, CD-4MCu, CA-6N, CA-28MWV
A744/A744M-84	CD-4MCu
A747/A747M-84	CB7Cu-1, CB7Cu-2
A757/A757M-84	E3N
MILITARY MILS-S 16993A	1

=====

VENDOR NAME AND ADDRESS:



HITCHINER

MANUFACTURING CO., INC.

MILFORD, NEW HAMPSHIRE 03055

TELEPHONE (603) 673-1100 FAX (603) 666-1861

TELEX 953014 CABLE ADDRESS HITCHINER

EMERGENCY PHONE NUMBER:

FIRE HAZARD CLASS: HEALTH: 0 FIRE: 0 REACTIVITY: 0
THE FOURTH DIAMOND:

ANSI: WARNING! WELDING, CUTTING, OR GRINDING ON THIS CASTING WILL
GENERATE TOXIC DUST OR FUMES.

TRW-00480

0908-1846

 SECTION II - HAZARDOUS COMPONENTS

<u>INGREDIENT</u>	<u>CAS NO.</u>	<u>PERCENT</u>	<u>TLV</u>	<u>PEL</u>
Carbon	7440-44-0	0.06-1.60	N/E	N/E
Chromium	7440-47-3	11.5-30.0	0.5 mg/cu.m	1 mg/cu.m
Chromium(VI)* (certain insoluble forms)			0.05 mg/cu.m	N/E
Cobalt	7440-48-4	0-3.50	0.1 mg/cu.m	0.1 mg/cu.m
Columbium (same as Niobium)		0-0.35	N/E	N/E
Copper (As dust)	7440-50-8	0-3.25	1.0 mg/cu.m	1.0 mg/cu.m
(As fume)			0.2 mg/cu.m	0.1 mg/cu.m
Iron (As fume)	7439-89-6	balance	5 mg/cu.m	10 mg/cu.m
Manganese (As dust)	7439-96-5	0.70-9.0	C 5 mg/cu.m	C 5 mg/cu.m
(As fume)			1 mg/cu.m	C 5 mg/cu.m
Molybdenum	7439-98-7	0-2.25	10 mg/cu.m	15 mg/cu.m
Nickel	7440-02-0	0-9.0	1 mg/cu.m	1 mg/cu.m
Nitrogen	7727-37-9	0-0.18	N/E	N/E
Phosphorus	7723-14-0	0.02-0.060	0.1 mg/cu.m	0.1 mg/cu.m
Silicon	7440-21-3	0.65-4.50	10 mg/cu.m	15 mg/cu.m
			(as nuisance dust)	
Sulfur	7704-34-9	0.02-0.040	N/E	N/E
Tungsten	7440-33-7	0-1.25	5 mg/cu.m	N/E
Vanadium		0-1.00		
(as vanadium oxide)	1314-62-1			
(As dust)			0.05 mg/cu.m	0.5 mg/cu.m
(As fume)			0.05 mg/cu.m	0.1 mg/cu.m

C means ceiling limit. These are limits which should not be exceeded, even for a short time. All other are 8 hr Time-weighted average concentrations.

Elements having a listed percentage greater than zero will be present in all grades. Those having a value of "0" may not be present in certain grades. Refer to Steel Founders' Society of America "Steel Castings Handbook" Supplement 2 for specifications on a particular ASTM alloy and grade.

* Water insoluble hexavalent chromium is classified as a human carcinogen by the American Conference of Governmental Industrial Hygienists (ACGIH). Approximately 66% of the total chromium in welding fume is hexavalent, and only 5% of that is insoluble. Overexposure to hexavalent chromium is not likely if general welding fume is controlled. (The alloy and its dust does not contain insoluble hexavalent chromium.)

TRW-00481

=====

N/E means none established. N/A means not applicable.
 N/D means no data available.

0908-1847

SECTION III - OVERVIEW

There are no chemical hazards from these castings in solid form at room temperature.

Dust or fumes are generated by machining, grinding, or welding on these castings. Since the castings contain a high percentage of iron, most of the dust or fume will be iron or iron oxide. There is no TLV for iron dust, but available information indicates that a concentration of 10 mg/cu.m., as if it were a nuisance dust, will serve as a guideline until a TLV is established.

Overexposure to iron oxide fume over a long time can cause siderosis, sometimes called "iron pigmentation" of the lung. It can be seen on a chest x-ray but causes little or no disability. Also see the Material Safety Data Sheet for the welding rod being used.

Since these castings contain up to 30 percent chromium, and up to 9 percent nickel, airborne contaminants from machining or welding will contain chromium and nickel dust or fume. If total welding fume is adequately controlled, chromium and nickel will also be controlled.

Welding or flame cutting may convert a small fraction of the chromium to the water insoluble hexavalent (carcinogenic) form.

Some forms of nickel have been found to cause cancer in animals. One form, nickel subsulfide, which was present in an old smelting process no longer used, apparently caused nasal cancer in humans. Since then, studies have shown that the potential for ordinary forms of nickel and its oxides to cause cancer in humans is very weak, if it exists at all.

Some grades contain moderate levels of manganese. Long term overexposure to manganese dust or fume can cause manganese poisoning. If welding or flame cutting fume is controlled to the TLV for total fume, the manganese fume will also be controlled.

Grinding on castings that have not been cleaned or that contain embedded sand may generate significant amounts of dust containing free silica, which can cause silicosis.

Carbon, cobalt, copper, niobium, nitrogen, molybdenum, phosphorus, silicon, sulfur, tungsten, and vanadium are also contained in the castings in low amounts. Overexposure to these would not be likely. If airborne concentrations of total dust and fume are controlled to levels below their respective TLVs and PELs, these minor constituents would also be adequately controlled.

SECTION IV - PHYSICAL DATA

PHYSICAL DESCRIPTION: Solid, silver gray in color, no odor

BOILING POINT: variable depending on casting grade

VAPOR PRESSURE: N/A

VAPOR DENSITY: N/A

SOLUBILITY IN WATER: N/A

TRW-00482

=====

N/E means none established. N/A means not applicable.

N/D means no data available.

SPECIFIC GRAVITY: 7.86 for iron
PERCENT VOLATILE BY VOLUME: N/A
EVAPORATION RATE: N/A

SECTION V - FIRE AND EXPLOSION DATA

Castings will not burn or explode.

SECTION VI - HEALTH HAZARD DATA

EYES: Metal particles in the eyes may cause irritation if not removed.

SKIN: None known.

BREATHING: Prolonged or repeated overexposure to iron oxide produced in grinding or welding may cause siderosis. Overexposure to manganese dust can cause manganism. Symptoms of manganism are sleepiness, weakness in the legs, emotional disturbances, uncontrollable laughter, and spastic gait. Breathing excessive amounts of silica dust for a long time can cause silicosis. Silicosis causes shortness of breath, reduced capacity to do work, and weakens the defenses against other lung diseases.

SWALLOWING: N/A

NOISE: Grinding or machining castings is noisy. The OSHA limit for noise averaged over 8 hours is 90 decibels (dBA), hearing conservation program required if exposure is over 85 dBA. If noise is at or above 90 dBA you should wear ear muffs or ear plugs.

===== FIRST AID =====
IF IN EYES: Metal particles should be removed by trained individuals such as a nurse or physician.
IF ON SKIN: N/A
IF BREATHED: (Fumes from welding): Move to fresh air.
IF SWALLOWED: N/A

SECTION VII - REACTIVITY DATA

HAZARDOUS POLYMERIZATION: Will not occur.

STABILITY: Stable.

INCOMPATIBILITY: Chromium metal dust may burn or explode when in contact with ammonium nitrate.

SECTION VIII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:

If damaged, return castings to vendor or send to scrap reclaimer.

Collected dust from machining, welding, etc. may be classed as a "hazardous waste" depending on circumstances. Consult local authorities regarding disposal.

TRW-00483

=====

N/E means none established.	N/A means not applicable.
N/D means no data available.	

SECTION IX - PROTECTIVE EQUIPMENT TO BE USED

RESPIRATORY PROTECTION: Wear a NIOSH approved respirator for dusts or fume if concentrations exceed the TLV or PEL.

VENTILATION: Provide general ventilation and/or local exhaust if necessary to maintain concentrations below the TLVs.

PROTECTIVE GLOVES: Work gloves advisable for handling castings.

EYE PROTECTION: Safety glasses with side shields and/or face shields for particles (grinding). Welding goggles or helmet for welding.

OTHER PROTECTIVE EQUIPMENT: Wear a protective apron and gauntlets if arc-air gouging or cutting, or welding on castings.

If noise is at or above 90 dBA you should wear ear muffs or ear plugs.

SECTION X - SPECIAL PRECAUTIONS OR OTHER COMMENTS

STORAGE: No special precautions.

INFORMATION PRESENTED HEREIN HAS BEEN COMPILED FROM SOURCES CONSIDERED TO BE RELIABLE AND IS ACCURATE AND RELIABLE TO THE BEST OF OUR KNOWLEDGE AND BELIEF BUT IS NOT GUARANTEED TO BE SO.

TRW-00484

=====
N/E means none established.

N/A means not applicable.

N/D means no data available.

0908-1850

PRODUCT NAME

Comtra No. S C-000-015

Refer to Material Safety Data Sheet for more information.



MANUFACTURER

HITCHINER

MANUFACTURING CO., INC.
MILFORD, NEW HAMPSHIRE 03055

FIRE HAZARD

4. EXTREMELY DANGEROUS FIRE AND EXPLOSION HAZARD
3. FIRE AND EXPLOSION HAZARD AT NORMAL TEMP
2. WILL BURN AT TEMPS ABOVE 100 F
1. WILL BURN AT TEMPS ABOVE 200 F
0. WILL NOT BURN

HEALTH
HAZARD

4. EXTREME HAZARD - AVOID CONTACT OR BREATHING VAPOR
3. SEVERE HAZARD - USE SPECIAL CLOTHING AND MASKS
2. HAZARDOUS - USE MASKS OR SPECIAL VENTILATION
1. SLIGHTLY HAZARDOUS - IRRITATING
0. NORMAL MATERIAL

REACTIVITY
HAZARD

4. EXTREME HAZARD - VACATE AREA IN CASE OF FIRE
3. SEVERE EXPLOSION HAZARD
2. VIOLENT CHEMICAL CHANGE POSSIBLE
1. UNSTABLE IF HEATED
0. NORMALLY STABLE

(Blue)

0

(Red)

0

(Yellow)

0

W
USE NO
WATERP
POLYMERIZESANSI: WARNING! CUTTING, OR
GRINDING ON THIS CASTING WILL GENERATE
TOXIC DUST OR FUMES.

INGREDIENTS (PERCENT)

Chromium	1.35 - 1.85
Iron	Balance
Nickel	2.5 - 3.90

See Material Safety Data Sheet for
a listing of minor ingredients.

STORAGE AND HANDLING

No Special Precautions

TRW-00485

0908-1851

MATERIAL SAFETY DATA SHEET (MSDS)
 SC-000-015 REV. 1 DATE 10/11/85 CODE 06-04
 CONFORMS TO REQUIREMENTS OF OSHA STANDARD 1910.1200
 "HAZARD COMMUNICATION" AND TO VARIOUS STATE
 "EMPLOYEE RIGHT TO KNOW" LAWS

COPYRIGHT 1985 STEEL FOUNDERS SOCIETY OF AMERICA

 SECTION I PRODUCT IDENTIFICATION

This MSDS supplied for: Chromium/Nickel Alloyed

ASTM No.

ACI alloy designation (Grades)

A757/A757M-84

E1Q, E2N1, E2N2, E2N3, E2Q1, E2Q2, E2Q3

=====

VENDOR NAME AND ADDRESS:



HITCHINER

MANUFACTURING CO., INC.

NEW YORK, NEW YORK 10014

TELEPHONE (212) 691-1100 FAX (212) 691-1101

TELEX 33014 LABEL ADDRESS TELETYPE

EMERGENCY PHONE NUMBER:

FIRE HAZARD CLASS: HEALTH: 0 FLAMMABILITY: 0 REACTIVITY: 0
 THE FOURTH DIAMOND:

ANSI: WARNING! WELDING, CUTTING, OR GRINDING ON THIS CASTING WILL
 GENERATE TOXIC DUST OR FUMES.

 SECTION II - HAZARDOUS COMPONENTS

<u>INGREDIENT</u>	<u>CAS NO.</u>	<u>PERCENT</u>	<u>TLV</u>	<u>PEL</u>
Carbon	7440-44-0	0.20-0.22	N/E	N/E
Chromium	7440-47-3	1.35-1.85	0.5 mg/cu.m	1 mg/cu.m
Chromium(VI)* (certain insoluble forms)			0.05 mg/cu.m	N/E
Copper (As dust)	7440-50-8	0.50	1.0 mg/cu.m	1.0 mg/cu.m
(As fume)			0.2 mg/cu.m	0.1 mg/cu.m
Iron (As fume)	7439-89-6	balance	5 mg/cu.m	10 mg/cu.m
Manganese (As dust)	7439-96-5	0.40-0.70	C 5 mg/cu.m	C 5 mg/cu.m
(As fume)			1 mg/cu.m	C 5 mg/cu.m
Molybdenum	7439-98-7	0.35-0.60	10 mg/cu.m	15 mg/cu.m
Nickel	7440-02-0	2.5-3.90	1 mg/cu.m	1 mg/cu.m
Phosphorus	7723-14-0	0.020-0.025	0.1 mg/cu.m	0.1 mg/cu.m
Silicon	7440-21-3	0.60	10 mg/cu.m	15 mg/cu.m
			(as nuisance dust)	
Sulfur	7704-34-9	0.020-0.025	N/E	N/E
Tungsten	7440-33-7	0-0.10	5 mg/cu.m	N/E
Vanadium		0.03		
(as vanadium oxide)	1314-62-1			
(As dust)			0.05 mg/cu.m	0.5 mg/cu.m
(As fume)			0.05 mg/cu.m	0.1 mg/cu.m

=====

N/E means none established.

N/A means not applicable.

N/D means no data available.

C means ceiling limit. These are limits which should not be exceeded, even for a short time. All other are 8 hr Time-weighted average concentrations.

Elements having a listed percentage greater than zero will be present in all grades. Those having a value of "0" may not be present in certain grades. Refer to Steel Founders' Society of America "Steel Castings Handbook" Supplement 2 for specifications on a particular ASTM alloy and grade.

* Water insoluble hexavalent chromium is classified as a human carcinogen by the American Conference of Governmental Industrial Hygienists (ACGIH). Approximately 66% of the total chromium in welding fume is hexavalent, and only 5% of that is insoluble. Overexposure to hexavalent chromium is not likely if general welding fume is controlled. (The alloy and its dust does not contain insoluble hexavalent chromium.)

SECTION III - OVERVIEW

There are no chemical hazards from these castings in solid form at room temperature.

Dust or fumes are generated by machining, grinding, or welding on these castings. Since the castings contain a high percentage of iron, most of the dust or fume will be iron or iron oxide. There is no TLV for iron dust, but available information indicates that a concentration of 10 mg/cu.m., as if it were a nuisance dust, will serve as a guideline until a TLV is established.

Overexposure to iron oxide fume over a long time can cause siderosis, sometimes called "iron pigmentation" of the lung. It can be seen on a chest x-ray but causes little or no disability. Also see the Material Safety Data Sheet for the welding rod being used.

Since these castings contain up to 10 percent chromium and up to 3.9% nickel, airborne contaminants from machining or welding will contain chromium and nickel dust or fume. If total welding fume is adequately controlled, chromium and nickel will also be controlled.

Welding or flame cutting may convert a small fraction of the chromium to the water insoluble hexavalent (carcinogenic) form.

Some forms of nickel have been found to cause cancer in animals. One form, nickel subsulfide, which was present in an old smelting process no longer used, apparently caused nasal cancer in humans. Since then, studies have shown that the potential for ordinary forms of nickel and its oxides to cause cancer in humans is very weak, if it exists at all.

Grinding on castings that have not been cleaned or that contain embedded sand may generate significant amounts of dust containing free silica, which can cause silicosis.

TRW-00487

=====
N/E means none established. N/A means not applicable.
N/D means no data available.

N/E means none established.
N/A means not applicable.
N/D means no data available.

TRW-00488

===== FIRST AID =====
IF IN EYES: Metal particles should be removed by trained individuals such as a nurse or physician.
IF ON SKIN: N/A
IF BREATHED: (Fumes from welding): Move to fresh air.
IF SWALLOWED: N/A

=====
NOISE: Grinding or machining castings is noisy. The OSHA limit for noise averaged over 8 hours is 90 decibels (dBA), hearing conservation program required if exposure is over 85 dBA. If noise is at or above 90 dBA you should wear ear muffs or ear plugs.
=====

SKIN: None known.
BREATHING: Breathing high concentrations of chromium and/or nickel dust or fume may cause deep lung irritation. Some forms of these metals can cause cancer; refer to the Overview of this MSDS. Breathing excessive amounts of silica dust for a long time can cause silicosis. Silicosis causes shortness of breath, reduced capacity to do work, and weakens the defenses against other lung diseases.
SWALLOWING: N/A
NOISE: Grinding or machining castings is noisy. The OSHA limit for noise averaged over 8 hours is 90 decibels (dBA), hearing conservation program required if exposure is over 85 dBA. If noise is at or above 90 dBA you should wear ear muffs or ear plugs.
=====

EYES: Metal particles in the eyes may cause irritation if not removed.
SKIN: None known.
BREATHING: Breathing high concentrations of chromium and/or nickel dust or fume may cause deep lung irritation. Some forms of these metals can cause cancer; refer to the Overview of this MSDS. Breathing excessive amounts of silica dust for a long time can cause silicosis. Silicosis causes shortness of breath, reduced capacity to do work, and weakens the defenses against other lung diseases.
SWALLOWING: N/A
NOISE: Grinding or machining castings is noisy. The OSHA limit for noise averaged over 8 hours is 90 decibels (dBA), hearing conservation program required if exposure is over 85 dBA. If noise is at or above 90 dBA you should wear ear muffs or ear plugs.
=====

SECTION VI - HEALTH HAZARD DATA

Castings will not burn or explode.

SECTION V - FIRE AND EXPLOSION DATA

PHYSICAL DESCRIPTION: Solid, silver gray in color, no odor
BOILING POINT: variable depending on casting grade
VAPOR PRESSURE: N/A
VAPOR DENSITY: N/A
SOLUBILITY IN WATER: N/A
SPECIFIC GRAVITY: 7.86 for iron
PERCENT VOLATILE BY VOLUME: N/A
EVAPORATION RATE: N/A

SECTION IV - PHYSICAL DATA

Carbon, copper, manganese, molybdenum, phosphorus, silicon, sulfur, tungsten, and vanadium are also contained in the castings in low amounts. Overexposure to these would not be likely. If airborne concentrations of total dust and fume are controlled to levels below their respective TLVs and PELs, these minor constituents would also be adequately controlled.

SECTION VII - REACTIVITY DATA
-----HAZARDOUS POLYMERIZATION: Will not occur.STABILITY: Stable.INCOMPATIBILITY: Chromium metal dust may burn or explode when in contact with ammonium nitrate.-----
SECTION VIII - SPILL OR LEAK PROCEDURES
-----STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:

If damaged, return castings to vendor or send to scrap reclaimer.

Collected dust from machining, welding, etc. may be classed as a "hazardous waste" depending on circumstances. Consult local authorities regarding disposal.

SECTION IX - PROTECTIVE EQUIPMENT TO BE USED
-----RESPIRATORY PROTECTION: Wear a NIOSH approved respirator for dusts or fume if concentrations exceed the TLV or PEL.VENTILATION: Provide general ventilation and/or local exhaust if necessary to maintain concentrations below the TLVs.PROTECTIVE GLOVES: Work gloves advisable for handling castings.EYE PROTECTION: Safety glasses with side shields and/or face shields for particles (grinding). Welding goggles or helmet for welding.OTHER PROTECTIVE EQUIPMENT: Wear a protective apron and gauntlets if arc-air gouging or cutting, or welding on castings.

If noise is at or above 90 dBA you should wear ear muffs or ear plugs.

SECTION X - SPECIAL PRECAUTIONS OR OTHER COMMENTS
-----STORAGE: No special precautions.

INFORMATION PRESENTED HEREIN HAS BEEN COMPILED FROM SOURCES CONSIDERED TO BE RELIABLE AND IS ACCURATE AND RELIABLE TO THE BEST OF OUR KNOWLEDGE AND BELIEF BUT IS NOT GUARANTEED TO BE SO.

TRW-00489

=====

N/E means none established. N/A means not applicable.

N/D means no data available.

0908-1855

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved
OMB No. 44-R1387

MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing,
Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME

Products Division/Cincinnati Milacron Marketing Co.

EMERGENCY TELEPHONE NO.

(513) 284-1318

ADDRESS (Number, Street, City, State, and ZIP Code)

4701 Marburg Avenue, Cincinnati, OH 45209

CHEMICAL NAME AND SYNONYMS
Not applicable (NA)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY
NA

FORMULA

Complex mixture

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS	none		BASE METAL	none	
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS	none	
OTHERS	none				
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV (Units)
The CIMPLUS concentrate contains diethanolnitrosamine, which dissipates					
in use.					

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	212	SPECIFIC GRAVITY (H ₂ O=1)	1.223
VAPOR PRESSURE (mm Hg.)	NA	PERCENT, VOLATILE BY VOLUME (%)	NA
VAPOR DENSITY (AIR=1)	NA	EVAPORATION RATE (_____ =1)	like water
SOLUBILITY IN WATER	100%		
APPEARANCE AND ODOR	clear; chemical		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	None; self-extinguishing	FLAMMABLE LIMITS	NA	Let	Uel
EXTINGUISHING MEDIA	No fire hazard				
SPECIAL FIRE FIGHTING PROCEDURES	NA				
UNUSUAL FIRE AND EXPLOSION HAZARDS	None				

TRW-00490

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE
None established

EFFECTS OF OVEREXPOSURE

No harmful effects expected when used as recommended.

EMERGENCY AND FIRST AID PROCEDURES

SKIN: Flush with water. EYES: Flush with running water for 15 minutes. Call a physician. INGESTION: Do not induce vomiting. Dilute with water or milk. Call a physician. INHALATION: No first aid required; not volatile.

SECTION VI - REACTIVITY DATA

STABILITY

UNSTABLE

CONDITIONS TO AVOID

STABLE

X

INCOMPATIBILITY (Materials to avoid)

Avoid contact of concentrate with strong acids.

HAZARDOUS DECOMPOSITION PRODUCTS

None

HAZARDOUS

POLYMERIZATION

MAY OCCUR

WILL NOT OCCUR

X

CONDITIONS TO AVOID

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Flush with water.

WASTE DISPOSAL METHOD

Ultrafiltration, acid-alum-polymer chemical treatment, or high temperature incineration.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)

None required

VENTILATION

LOCAL EXHAUST

SPECIAL

MECHANICAL (General)

General

OTHER

PROTECTIVE GLOVES

Not required

EYE PROTECTION

Safety goggles recommended when handling concentrate.

OTHER PROTECTIVE EQUIPMENT

Normal metalworking plant protective equipment.

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

None required

TRW-00491

OTHER PRECAUTIONS

See product label. Product labels for use in shop available to bulk users.

MATERIAL SAFETY DATA SHEET

For Assistance, Contact:
Regulatory Affairs Dept.
PO Box 907 Ames, IA

HACH COMPANY
PO BOX 907
AMES, IA 50010

Emergency Telephone #
(515) 232-2533

I. PRODUCT IDENTIFICATION

CATALOG NUMBER: 12710 PRODUCT NAME: ChromaVer® 3
CAS. NO: Not applicable CHEMICAL NAME: Not applicable
FORMULA: Not applicable
CHEMICAL FAMILY: Not applicable

II. INGREDIENTS

INGREDIENTS	Z	TWA	CAS NUMBER	NATURE of HAZARD	RCRA
Potassium Pyrosulfate	<85	None listed	7790-62-7	Aqueous Solution is strongly acidic	None
Magnesium Sulfate Heptahydrate	<25	None listed	7487-88-9	Moderately toxic; may cause irritation	None
Other component	<1	Not applicable	Not applicable	Not applicable	NA

III. PHYSICAL DATA

STATE: solid | APPEARANCE: white or light pink powder | ODOR: Not determined

SOLUBILITY IN: WATER: Slightly soluble | ACID: Soluble | OTHER: Not determined

BOILING PT.: NA | MELTING PT.: 215C decomp | SPECIFIC GRAVITY: 2.26 | pH: of 5% soln = 1.1

VAPOR PRESSURE: Not applicable | VAPOR DENSITY (air=1): NA | EVAPORATION RATE: NA

METAL CORROSIVITY - ALUMINUM: 0.014 in/yr STEEL: ND | SHELF LIFE: stable 6 to 12 months

STORAGE PRECAUTIONS: Store in a cool, dry place.

IV. FIRE, EXPLOSION HAZARD AND REACTIVITY DATA

FLASH PT.: Not applicable | METHOD: NA | FLAMMABILITY LIMITS - LOWER: NA UPPER: NA

SUSCEPTIBILITY TO SPONTANEOUS HEATING: None

SHOCK SENSITIVITY: None | AUTOIGNITION PT.: ND

EXTINGUISHING MEDIA: water, carbon dioxide, or dry chemical

UNUSUAL FIRE AND EXPLOSION HAZARD: May emit toxic fumes

HAZARDOUS DECOMPOSITION PRODUCTS: Toxic SOx fumes

OXIDIZER: No | NFPA Codes Health: 2 Flammability: - Reactivity: -

CONDITIONS TO AVOID: Heat, flames, moisture

V. HEALTH HAZARD DATA

THIS PRODUCT IS corrosive to eyes, wet skin and respiratory tract.

ACUTE TOXICITY: Toxic due to corrosivity
ROUTE OF MOST DETRIMENTAL EXPOSURE: ingestion, inhalation
TARGET ORGANS: all body tissues

CHRONIC TOXICITY: Not determined
ROUTE OF MOST DETRIMENTAL EXPOSURE: Not determined
TARGET ORGANS: Not determined

LONG-TERM EFFECTS: Not applicable
ROUTE OF EXPOSURE: Not applicable
TARGET ORGANS: Not applicable

OVEREXPOSURE: Causes burns

VI. PRECAUTIONARY MEASURES

Wash thoroughly after handling.
Avoid contact with eyes, skin and clothing.
Do not breathe chemicals.
Protect from moisture.

PROTECTIVE EQUIPMENT: hood, disposable gloves, safety glasses, lab coat

VII. FIRST AID

EYE AND SKIN CONTACT: Immediately flush eyes and skin with water for 15 minutes. Remove contaminated clothing. Call physician.

INGESTION: Do not induce vomiting. Give large quantities of water. Give at least 1 ounce of milk of magnesia in an equal amount of water, or the whites of 3 eggs. Never give anything by mouth to an unconscious person. Call physician.

INHALATION: Remove to fresh air.

VIII. SPILL AND DISPOSAL PROCEDURES

IN CASE OF SPILL OR RELEASE: Cover the contaminated surface with sodium bicarbonate or a soda ash-slaked lime mixture (50-50). Mix and add water if necessary to form a slurry. Scoop up slurry and wash down the drain with excess water. Wash the site with soda ash solution.

DISPOSE OF IN ACCORDANCE WITH ALL FEDERAL, STATE, AND LOCAL REGULATIONS.

IX. TRANSPORTATION DATA

PROPER SHIPPING NAME: NCR

HAZARD CLASS: Not applicable ID: NA

DATE: 09/05/85! CHANGE NO.: 3925

X. REFERENCES

- 1) In-house information
- 2) Judgement of technical person compiling data.
- 3)
- 4)
- 5)
- 6)
- 7)
- 8)

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

TRANSPARENT GRINDING FLUID

CIMPLUS®

DESCRIPTION

CIMPLUS grinding fluid is a transparent, water-based chemical solution.

APPLICATION

Recommended for use on ferrous metals in applications such as centertype, horizontal and vertical spindle surface grinding (both reciprocating and rotary tables), and light-duty centerless work. Also, excellent for toolroom and job shop operation.

While it protects copper and brass machine tool components such as gages, coolant lines, chucks, etc., from corrosion, CIMPLUS is not recommended for grinding aluminum and copper alloys.

CINCINNATI
MILACRON

0908-1860

TRW-00494

FEATURES AND BENEFITS

- Transparent — operators can see their work in progress.
- Open, free grinding — no wheel loading, no burn. Not oily. Has good settling properties to help prevent fluid-caused wheel loading. Many parts can be ground between wheel dressings. Production is maximized.
- Good settling improves part finishes. Fines settle fast enough to prevent recirculation of finish-marring grit and swarf, yet slowly enough to avoid clogging return lines in both individual machines and central systems.
- Outstanding ferrous corrosion control — protects machine tools and in-process parts from rusting.
- Freedom from rancidity. No "Monday morning" odor. Long fluid life.
- Clean — no slippery, oily desposits on machines or parts. Operators like the freedom from soiled clothing and oily hands.
- Mild and nonirritating to skin when used within the recommended dilution range.
- CIMPLUS is economical: (1) It is long-lasting, so fluid cost and expensive downtime for cutting fluid changes are minimized; (2) the concentrate is used at very lean dilutions; (3) the mix has a low carry-off; and (4) excellent corrosion control helps minimize rework and scrap.

Ask your local Cincinnati Milacron Distributor for a trial today.



TRW-00495

0908-1861

CIMPLUS

RECOMMENDED STARTING DILUTIONS

Operation	Carbon Steels, Malleable Iron, Cast Iron	High Alloy Steels, Stainless Steels	Tool Steels, Drill Rod, Cast Steels
Grinding	1:100 (1.0%)	1:150 (0.7%)	1:100 (1.0%)
Machining	1:100 (1.0%)	—	—

Not recommended for grinding aluminum and copper alloys — may cause stain.

CIMPLUS is to be mixed with water for use. Add no other substances to the concentrate or mix unless approved by Cimcool Technical Services (513-841-8133).

RECOMMENDED CIMCOOL MIX MASTER PROPORTIONER TIP SIZES

Dilution	1:100 (1.0%)	1:120 (0.8%)	1:150 (0.7%)
Tip Size	60	64	66

After installation of the tip, titrate the mix to be sure the concentration is correct.

For concentration analysis, use the CIMPLUS Permanganate Titration Procedure.

Because the importance of rust control varies from job to job, the above dilutions may be made leaner where rust control is not a large problem, or can be made richer where rust control is difficult.

TYPICAL PHYSICAL AND CHEMICAL PROPERTIES

Physical state	liquid
Appearance and odor	clear; chemical
Colors available	undyed, green, pink*
Solubility in water	100%
Weight, lb/gal, 60°F (15.6°C)	10.20
Specific gravity (H ₂ O = 1)	1.223
Boiling point, °F (°C)	212 (100)
Flash point, COC, °F (°C)	none
Fire point, COC, °F (°C)	none
Extinguishing media	no fire hazard
Unusual fire & explosion hazards	none
Freezing point (or pour point), °F (°C)	-18 (-27.8)
If frozen, thaw completely at room temperature.	
pH, concentrate	10.6
pH, 1:100 (1.0%) mix, typical operating conditions	8.6
Total chlorine/chloride, wt %, calculated	none/0.0025
Total sulfur, wt %, calculated	0.18
Phenols, phosphates, mercurials, PCB's, mineral oil, PTBBA	none

PACKAGING

Available in 5-gallon pails, 55-gallon drums, Liqua Bins, and in tank truck and tank car quantities.

Do not reuse container before cleaning. After cleaning, remove label and relabel appropriately.

DOT LABELING REQUIREMENTS

Hazardous Materials Description and Proper Shipping Name (49 CFR 172.101):	Hazard Class (49 CFR 172.101):
Not a hazardous material	Not applicable

* Green and pink versions available in quantities of no less than 10 drums.

TRW-00496

0908-1862

Product Safety Data

CIMPLUS

HEALTH HAZARD DATA

Not for internal consumption.

Emergency and First Aid Procedures:

- Skin— Avoid prolonged contact with concentrate. Flush with water.
Eyes— In case of contact with concentrate, flush with running water for 15 minutes. Call a physician.
Ingestion— If concentrate is swallowed, do not induce vomiting. Dilute with water or milk. Call a physician.
Inhalation— No first aid required; concentrate not volatile.

The following toxicity tests were conducted in accordance with the techniques specified in the Regulations for the Enforcement of the Federal Hazardous Substances Act (16 CFR 1500.3, revised 1982).

- Acute Oral Toxicity (LD₅₀—Rats)— Above 5 g/kg for a 2% mix.
Acute Inhalation Toxicity (LC₅₀—Rats)— Above 20 mg/l for a 2% mix.
Acute Eye Irritation (Rabbits)— Negative for a 2% mix; no irritative or corrosive effects.
Primary Skin Irritation (Rabbits)— Negative for a 2% mix; noncorrosive and not a primary skin irritant.

REACTIVITY DATA

- Stability— Stable.
Hazardous polymerization— Will not occur.
Incompatibility (materials to avoid)— Avoid contact of concentrate with strong acids
What volatile products are given off if subjected to open flame or abnormally high temperatures— Water vapor, carbon dioxide, and organic vapors.

SPILL OR LEAK PROCEDURES

- Steps to be taken if material is released or spilled— Flush with water.
Recommended disposal method(s)— Ultrafiltration, acid-alum-polymer chemical treatment, or high temperature incineration.

SPECIAL PROTECTION INFORMATION

- Respiratory Protection— None required.
Ventilation— No special requirements.
Protective Gloves— Not required.
Eye Protection— Safety goggles recommended when handling concentrate.
Other Protective Equipment— Normal metalworking plant protective equipment.

SPECIAL PRECAUTIONS

- Handling and Storage— None required.
Precautionary Labeling— See product label. Product labels for use in shop available to bulk users.

Minor formulation changes or normal variations in the manufacture of this product may cause slight variances in the data presented on this sheet.

2 1 - 2 M - A

PC-899 (replaces PC-482-6 and PC-540-2)

8/84

Products Division | Cincinnati Milacron Marketing Company
Cincinnati, Ohio 45209

0908-1863

TRW-00497

ATTACHMENT I

CIMCOOL® products and metalworking fluid additives which would be classified as hazardous wastes under the provisions of the Resource Conservation and Recovery Act regulations if discarded in the concentrated, undiluted form.

<u>PRODUCT</u>	<u>BASIS FOR HAZARDOUS WASTE CLASSIFICATION</u>
CIMGUARD® 10	Flash Point Less Than 140°F
CIMGUARD 20	Flash Point Less Than 140°F
CIMGUARD 61	Flash Point Less Than 140°F
*CIMCLEAN® 10	pH 12.5 or higher
*ADDITIVE F	pH 12.5 or higher
*ADDITIVE MC	pH 12.5 or higher
*ADDITIVE LC	pH 12.5 or higher
*INHIBITOR 68	pH 12.5 or higher
*INHIBITOR C	pH 12.5 or higher
*WATER CONDITIONER V	pH 12.5 or higher

*When added to water or diluted CIMCOOL metalworking fluid at the recommended dilution, these materials are no longer classified as Hazardous Wastes.

J. T. BAKER CHEMICAL CO. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (201) 452-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8302

C4730 -01

CITRIC ACID, MONOHYDRATE

PAGE: 1

EFFECTIVE: 03/11/86

ISSUED: 04/17/86

SECTION I - PRODUCT IDENTIFICATION

PRODUCT NAME: CITRIC ACID, MONOHYDRATE
FORMULA: $\text{HOC}(\text{COOH})(\text{CH}_2\text{COOH})_2 \cdot \text{H}_2\text{O}$
FORMULA WT: 210.14
CAS NO.: 05949-29-1
COMMON SYNONYMS: 2-HYDROXY-1,2,3,PROPANE--TRICARBOXYLIC ACID, MONOHYDRATE
PRODUCT CODES: 0118, 0120, 0119, 0110

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH	- 0
FLAMMABILITY	- 1
REACTIVITY	- 0
CONTACT	- 1

LABORATORY PROTECTIVE EQUIPMENT

SAFETY GLASSES; LAB COAT

PRECAUTIONARY LABEL STATEMENTS

CAUTION

MAY CAUSE IRRITATION

DURING USE AVOID CONTACT WITH EYES, SKIN, CLOTHING. WASH THOROUGHLY AFTER HANDLING. WHEN NOT IN USE KEEP IN TIGHTLY CLOSED CONTAINER.

SECTION II - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
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CITRIC ACID, MONOHYDRATE		05949-29-1
--------------------------	--	------------

SECTION III - PHYSICAL DATA

BOILING POINT:	N/A	VAPOR PRESSURE(MM HG):	N/A
MELTING POINT:	N/A	VAPOR DENSITY(AIR=1):	N/A
SPECIFIC GRAVITY: (H2O=1)	1.54	EVAPORATION RATE: (EUTYL ACETATE=1)	N/A
SOLUBILITY(H2O):	APPRECIABLE (MORE THAN 10 %)	% VOLATILES BY VOLUME:	0
APPEARANCE & ODOR:	WHITE, ODORLESS POWDER.		

CONTINUED ON PAGE: 2

TRW-00499

0908-1865

J. T. BAKER CHEMICAL CO. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (201) 259-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

04730-01

CITRIC ACID, MONOHYDRATE

PAGE: 2

EFFECTIVE: 03/11/86

ISSUED: 04/17/86

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: N/A

FIRE EXTINGUISHING MEDIA

USE WATER SPRAY, CARBON DIOXIDE, DRY CHEMICAL OR ORDINARY FOAM.

SPECIAL FIRE-FIGHTING PROCEDURES

FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE

TOXIC GASES PRODUCED

CARBON MONOXIDE, CARBON DIOXIDE

SECTION V - HEALTH HAZARD DATA

TOXICITY TEST RESULTS ARE LISTED FOR THE ANHYDROUS SUBSTANCE.

TOXICITY:	LD50 (GAL-RAT)(G/KG)	-	11.7
	LD50 (IPR-RAT)(MG/KG)	-	983
	LD50 (SCU-RAT)(MG/KG)	-	5500
	LD50 (ORAL-MOUSE)(MG/KG)	-	5040

EFFECTS OF OVEREXPOSURE

DUST MAY IRRITATE NOSE AND THROAT.

DUST MAY CAUSE HEADACHE, COUGHING, DIZZINESS OR DIFFICULT BREATHING.

DUST MAY IRRITATE OR BURN MUCOUS MEMBRANES.

CONTACT WITH SKIN OR EYES MAY CAUSE IRRITATION.

EMERGENCY AND FIRST AID PROCEDURES

INGESTION: IF SWALLOWED AND THE PERSON IS CONSCIOUS, IMMEDIATELY GIVE LARGE AMOUNTS OF WATER. GET MEDICAL ATTENTION.

INHALATION: IF A PERSON BREATHES IN LARGE AMOUNTS, MOVE THE EXPOSED PERSON TO FRESH AIR.

EYE CONTACT: IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. GET MEDICAL ATTENTION.

SKIN CONTACT: IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES.

SECTION VI - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

INCOMPATIBLES: STRONG BASES, ALKALI METALS, ORGANIC ACIDS, OXIDES OF SULFUR

DECOMPOSITION PRODUCTS: CARBON MONOXIDE, CARBON DIOXIDE

CONTINUED ON PAGE: 3

TRW-00500

J. F. MAKER CHEMICAL CO. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08965
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (201) 359-2151
CHEMTREC # (800) 424-9302 -- NATIONAL RESPONSE CENTER # (800) 424-8302

04730 -01

CITRIC ACID, MONOHYDRATE

PAGE: 3

EFFECTIVE: 03/11/85

ISSUED: 04/17/86

SECTION VII - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE

WEAR SUITABLE PROTECTIVE CLOTHING. CAREFULLY SWEEP UP AND REMOVE.

DISPOSAL PROCEDURE

DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

SECTION VIII - PROTECTIVE EQUIPMENT

VENTILATION:

USE ADEQUATE GENERAL OR LOCAL EXHAUST VENTILATION TO KEEP FUME OR DUST LEVELS AS LOW AS POSSIBLE.

RESPIRATORY PROTECTION:

NONE REQUIRED WHERE ADEQUATE VENTILATION CONDITIONS EXIST. IF AIRBORNE CONCENTRATION IS HIGH, USE AN APPROPRIATE RESPIRATOR OR DUST MASK.

EYE/SKIN PROTECTION:

SAFETY GLASSES WITH SIDESHIELDS, NITRILE GLOVES RECOMMENDED.

SECTION IX - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE

SPECIAL PRECAUTIONS

KEEP CONTAINER TIGHTLY CLOSED. SUITABLE FOR ANY GENERAL CHEMICAL STORAGE AREA.

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME

CHEMICALS, N.O.S.

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME

CHEMICALS, N.O.S.

(TM) AND (R) DESIGNATE TRADEMARKS.

N/A = NOT APPLICABLE OR NOT AVAILABLE

THE INFORMATION PUBLISHED IN THIS MATERIAL SAFETY DATA SHEET HAS BEEN COMPILED FROM OUR EXPERIENCE AND DATA PRESENTED IN VARIOUS TECHNICAL PUBLICATIONS. IT IS THE USER'S RESPONSIBILITY TO DETERMINE THE SUITABILITY OF THIS INFORMATION FOR THE ADOPTION OF NECESSARY SAFETY PRECAUTIONS. WE RESERVE THE RIGHT TO REVISE MATERIAL SAFETY DATA SHEETS PERIODICALLY AS NEW INFORMATION BECOMES AVAILABLE.

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TRW-00501

0908-1867



THE LEA MANUFACTURING COMPANY

World Headquarters: 237 East Aurora St., P.O. Box 71,

Waterbury, CT. 06720 Tel.: (203) 753-5116 Cable Address LEACO

MATERIAL SAFETY DATA SHEET

This material safety data sheet contains all available pertinent information to enable you to comply with Title 29 CFR Hazard Communication Program, and environmental regulations, by identifying any material which may be a health hazard or contribute hazardous characteristics to a waste stream, thereby enabling you to properly follow all regulations, including storage, labeling and disposal of its waste. Unless specifically indicated on this sheet, our product:

- A. Is not an oxidizer
- B. Is not potentially explosive
- C. Does not react violently with water
- D. Is not corrosive as defined in 49 CFR
- E. Does not have a flash point less than 60° C (140° F)
- F. Does not generate toxic gases when mixed with water
- G. Does not promote any Target Organ Effects in the workplace
- H. Does not cause reversible inflammation on the skin as an irritant
- I. Does not cause substantial allergic reactions on the skin, Sensitizer
- J. Is not Highly Toxic or Toxic as defined in NIOSH from animal studies
- K. Does not contain any carcinogen as regulated by IARC, NTP, or OSHA
- L. Does not contain any toxic organics as defined in 40 CFR parts 413 & 433

M. Does not contain any of the following:

- | | |
|----------|-------------------------|
| Arsenic | Sulfur |
| Barium | Silver |
| Cadmium | Cyanide |
| Chromium | Phosphates |
| Lead | Chelating Agents |
| Mercury | Any other heavy metal |
| Nickel | Halogenated Solvent |
| Selenium | Non-halogenated Solvent |

SECTION 1 PRODUCT IDENTIFICATION

FOR THE FOLLOWING GREASELESS OR LEA COMPOUND MIXTURES:

A, A-17, B, B-31, C, Cleanegg, HD-8, HD-12, HD-15, HD-18, HD-20, HD-30
 JR, L, LM-8, LM-12, LM-15, LM-18, LM-20, LM-24, LM-32
 LRB-8, LRB-12, LRB-15, LRB-18, LRB-20, LRB-24, LRB-32
 LRP-8, LRP-12, LRP-15, LRP-20, LRP-24
 LTPL-12A, LTPL-15A, LTPL-18A, LTPL-20A, LTPL-22A, LTPL-24A
 OR-20H, PL-8A, PL-12A, PL-15A, PL-18A, PL-24A, PMC-3022-1
 Q, R-8, R-12, R-15, R-18, R-20, R-24, R-30
 RW-8, RW-12, RW-15, RW-18, RW-20, RW-22, RW-24, RW-32, S-12, S-20, S-24
 1-A-5, 4F, 13, 15CE, 80A, 96, 120A, 150A, 170A, 180A, 200A, 220A, 240A
 Coarse, Medium

Buffing or Polishing Compounds are designed to be applied to a rotating buffing wheel for the removal or flowing of the surface of metals, plastics or wood. According to Department of Transportation Regulations, this material is considered non-hazardous and non-toxic in shipping and storage.

SHIPPING NAME NMFC #48580 - Scouring Compounds, NOI. (cake form or liquid)
 NMFC Class 55 for LTL - Class 35 for truckload
 U.S. Export Commodity #492.1540 - Polishing Compound



Manufacturers of Chemical and Abrasive Specialties

TRW-00502

0908-1868

SECTION 2 HAZARDOUS INGREDIENTS OR IDENTITY

FOLLOWING ARE THE INGREDIENTS CONTAINED IN OUR MIXTURES (COMPOUNDS). THE CHEMICAL ABSTRACT SERVICE NUMBERS (CAS#) AND TLV ARE LISTED FOR CONSTITUENTS THAT ARE REGULATED ACCORDING TO ALL CURRENT "RIGHT-TO-KNOW LAWS."

Water	9% to 24%
Industrial Gelatine	9% to 24%
Aluminum Oxide Abrasive	More than 60%
Borax and/or Boric Acid	Less than 1%
Proxel Preservative	Less than 0.1%

SECTION 3 PHYSICAL AND CHEMICAL CHARACTERISTICS

Solid dense brick or creamy liquid with mild odor. Specific Gravity more than 1.2.
Solubility in water for liquids partial.

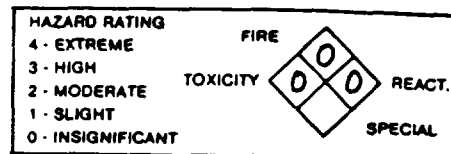
FIRE EXPLOSION DATA:

Flash point over 350° F. Auto ignition temp.. 300° C.
Flammable limits not applicable.

When product is subjected to abnormally high temperatures, carbon monoxide may be formed.

In case of fire, use water fog, dry chemical or carbon dioxide. Water may cause violent frothing requiring full facepiece and self-contained apparatus.

NATIONAL FIRE PROTECTION ASSOCIATION



SECTION 4 PHYSICAL HAZARDS (REACTIVITY DATA)

Material is stable and hazardous polymerization will not occur. Incompatibility exists with strong alkalis like sodium hydroxide.

SECTION 5 HEALTH HAZARD DATA

TLV (Total mass for dust while using) 10.0 mg/M³

In case of contact with eyes, rinse with plenty of water for at least 15 minutes.
Wash skin with soap and water. If swallowed, induce vomiting by sticking finger down throat. Never give anything to anyone unconscious or suffering convulsions.

SECTION 6 SPECIAL PROTECTION INFORMATION

When material is being used, suitable exhaust equipment is required with eye protection, clothing and gloves to prevent compound dust or materials being removed during the buffing operation from entering the nose, throat or skin of the buffer.

The U.S. Department of Health, Education & Welfare - National Institute for Occupational Safety & Health (NIOSH) has publications to assist in maintaining a safe environment as:

Abrasive Metal Finishing, Item 1733-00122-7, U.S. Printing Office, Wash.,DC 20402

Ventilation Requirements for Grinding, Polishing & Buffing #277-332/3.
National Technical Information Service, Springfield, VA 22161

Industrial Ventilation - A Manual of Recommended Practices. American Conference of Governmental Industrial Hygienists, P.O. Box 16153, Lansing, MI 48901.

SECTION 7 SPECIAL PRECAUTIONS

Keep out of sun and away from heat. Keep liquids and paste from freezing. Prevent cartons and fibre drums from excessive moisture. Empty containers retain product residues, therefore do not reuse containers without reconditioning. Put nothing else in container with product.

SPILL PROCEDURE AND WASTE DISPOSAL TREATMENT

In case of spill, sweep material into containers. Buffing wheel wastes may contain wheel lint which is combustible. Dispose of in accordance with regulations.

SKY PRODUCTS CO.
110 GOODALE STREET
PEABODY, MA 01960
PHONE: (617) 535-4545

APPLICATION GUIDE FOR USING **CLEANER NO. 10 CONCENTRATE**

GENERAL NOTES:

1. IMPORTANT. When using CLEANER NO. 10 in old containers or tanks, be certain to thoroughly remove old solvents by rinsing at least 3 times with fresh CLEANER NO. 10, otherwise offensive odors will result from the water mixing with the solvents.
2. CLEANER NO. 10 will work faster and more efficiently when heated to 120 F. This temperature is recommended for removal of heavy soils, floor stripping, and machinery cutting oils. Can be used up to 180 F, but some discoloration of aluminum, copper and brass may result.
3. CLEANER NO. 10 is safe (when properly diluted) for all metals and materials including Aluminum, Brass, Ceramic, CR Steel, Enamel, Forgings, Glass, Linoleum, Magnesium, Paints*, Stainless Steel, Tiles.
- *As with any cleaner, always test on small area for proper dilution.
4. If surface is to be painted, wipe dry or rinse with fresh water after cleaning.
5. To reduce flash rusting on iron and steel, do not rinse CLEANER NO. 10 from bare metals. For additional rust inhibiting, order "CLEANER NO. 10RI".
6. Always allow time for cleaners to soften soils before wiping or rinsing. Let the cleaner do the work you paid for.
7. For hard-to-remove soils, or where time is of the essence, heating, scrubbing, agitation, or circulation of the cleaner will always increase the cleaning action. Call factory to find out about Cleaning Tanks with built-in heating and circulation.
8. For certain extremely heavy greasy or soiled conditions, CLEANER NO. 10 may be used full strength.
9. For applications where foam may be undesirable (floor scrubbers, agitating mixers, power washers, etc.), specify "CLEANER NO. 10LF".
10. When using CLEANER NO. 10, do not "wet down the surface" with water first. This dilutes the Cleaner. It also wastes water and your time. CLEANER NO. 10 has wetting agents which are far more efficient at wetting the surface. Apply CLEANER NO. 10 first, allow to work, and then rinse off with water to get your clean surfaces.
11. Call your CLEANER NO. 10 Representative, or the factory, for newest application information which could save you time and money. Because of the high concentration of CLEANER NO. 10, the dilution rates will probably not be the same as with your present cleaner.

OVER

032086

TRW-00504

0908-1870

GENERAL BUILDING MAINTENANCE:

Heavy Floor Grease, Stubborn Stains,
Shower Room Tiles, Rug Spotting.....Use full strength

Floor Wax Stripping.....Dilute with water..5:1
Use hot water for speed. For low foam, specify "CLEANER NO.10LF".

Walls, Desks, Floors, Lavatories, Sinks, Dishwashing, Tiles,
Furniture, Cafeterias, Tables, Toilets, Fixtures, Counters.....50:1

Glass, Windows, Mirrors, Ornamental Metals.....85:1

PRODUCTION DEPARTMENT:

Metals in Production Machining:
Heavy brown cutting oil removal*.....1:1
Water soluble cutting oil removal.....5:1

Printed Circuit Boards: Flux, ink removal*.....1:1

Computer Keyboards (ink removal)*.....1:1

Lapping Compound: Thoroughly removes from metals, glass, plastics*..1:1

Ultrasonic Cleaning, Spray washers.....up to 20:1
For Low Foam, specify "CLEANER NO. 10LF".

Pre-clean for Plating.....20:1

Vibratory and Tumbling Lubricant.....to 500:1

NOTE: CLEANER NO. 10 can absorb oils up to 100% of its volume. When this is reached, allow to stand several hours. Oil separates and rises to top. Skim off oil or centrifuge and reuse or dispose as an "oily waste". Remaining CLEANER NO. 10 can be reused or disposed down drain. See local regulations. Add new solution as needed.

MACHINE SHOP MAINTENANCE:

Heavy Grease, Floors, Machinery, Transmissions, Pumps*.....to 3:1

Oils on Machines, Production Equipment, Hand Tools, Tool Kits.....5:1

Flushing Cutting Oil/Coolant Systems.....5:1

Washing Hands.....10:1

Steam Cleaning (Clayton Hydro):.....20:1
NOTE: For extra rust protection, specify "CLEANER NO. 10RI".

VEHICLE/AUTOMOTIVE MAINTENANCE:

Engines, Transmissions: Apply full strength; wait 5 minutes; flush with cold or hot water or pressure washer. No need to steam clean.

Pressure Washers.....20:1

Interiors: Rugs, Dashboards, Upholstery, Vinyl, Leather.....10:1

Exteriors: Hand or Pressure Wash, Windows.....200:1

Whitewalls, Greasy Spots, Wire Wheels.....full strength
(Safe for Aluminum)

TRW-00505

SPECIAL APPLICATIONS:

Ship Bilges.....Use full strength as required

Removal of paper backing on plastic (Plexiglas) sheets both old and new.....brush on or soak full strength; allow to stand 1/2 hour; slowly peel paper off.

* may require agitation, circulation or heating of the cleaning solution. Consult factory for available Cleaning Tanks.



United States
Department of
Agriculture

Food Safety
and Inspection
Service

Science
Building 306, BARC-East
Beltsville, MD 20705

CLEANER #10

CONCENTRATE

February 28, 1985

Mr. Allen J. Cohen
Sky Products Co.
110 Goodale Street
Peabody, MA 01960

Dear Mr. Cohen:

This is in reply to your request for compound authorization received on January 16, 1985.

Your product Cleaner No. 10 is acceptable as a floor and wall cleaner for use in official establishments operating under the Federal meat, poultry, shell egg grading, and egg products inspection programs.

Before using this compound, food products and packaging materials must be removed from the room or carefully protected. After using this compound, surfaces must be thoroughly rinsed with potable water.

Acceptance of this compound by this Department is in no way to be construed as an endorsement of the compound or of any claims made for it.

If any change is made in the labeling information or formulation, the authorization for use in official plants becomes void immediately.

Sincerely,

Charles R. Edwards, Chief

Charles R. Edwards, Chief
Product Safety Branch
Food Ingredient Assessment Division

0908-1872

TRW-00506

ELLEN R. MARDER
SALES SPECIALIST

~~800-402-0444~~

755-0157

SKY PRODUCTS CO.

110 GOODALE STREET
PEABODY, MA 01960

(617) 535-4545

**As of now,
all other cleaners
are obsolete.**

**A SAFETY REPORT ON HAZARDOUS
AND NON-HAZARDOUS CLEANERS**

C L E A N E R
NO. **10**[®]
TODAY'S CHALLENGER

0908-1874

TRW-00508

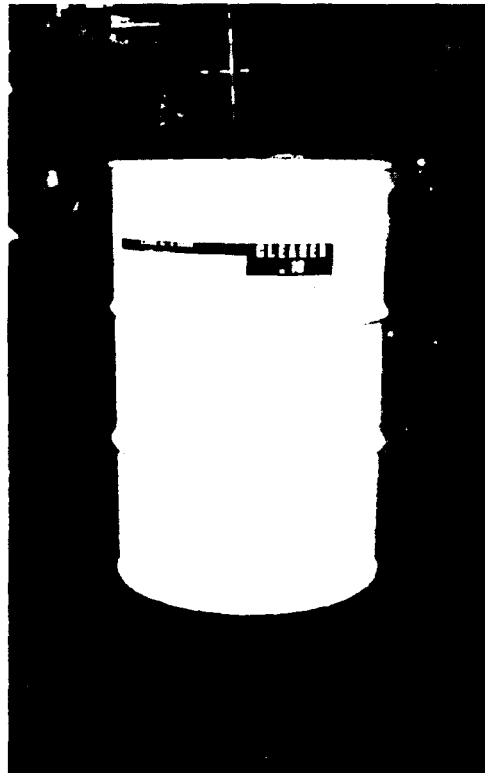
A NOTE TO CONSUMERS

The makers of CLEANER NO. 10 are dedicated to continued improvement of their product and services. We sincerely invite comments about your experiences with cleaning and degreasing tasks. This information will enable us to continue to meet the cleaning needs of Commerce and Industry with the safest, most effective and most economical cleaning product available today.

Send comments or requests for information to:

SKY Products Co.
110 Goodale Street
Peabody, MA 01960

Phone: 617-535-4545



TO: Customers.

MEMO

FROM: *Ellen Marder 755-0157*

SUBJECT: Increased Safety and Efficiency in Cleaning.

It takes only five minutes of reading to discover how to increase worker safety, cleaning effectiveness, and economy using CLEANER NO.10. The first two pages of this report contain all the information you need. The remainder of the text is more technical information for those of you who want it.

Why not invest five minutes toward a safer, cleaner workplace -- and a chance to save money too?

As your manufacturer's representative, I'll be glad to answer any questions you have about this report or any of the features of our unique CLEANER NO. 10.

WHAT IS THE PURPOSE OF THIS REPORT?

The purpose of this Report is to inform the reader about industrial hazards that employees are often needlessly exposed to in the workplace. It will also show how a new scientific discovery will reduce overall exposure to these hazards and simultaneously reduce operation costs in the areas of cleaning and degreasing.

WHAT IS WRONG WITH OTHER CLEANERS?

They are highly hazardous, endangering your health. Until now, none of the cleaners that were safe to use would really do a good job in cleaning and grease removal. Because caustics, butyls and other solvents are inexpensive for manufacturers, they are widely used in cleaning products. These ingredients can cause serious long-term dangers to the user's health, as you will see in this Report.

They can be fire hazards. Many petroleum based cleaners are flammable at low temperatures, adding an unnecessary fire hazard to your premises. To reduce this hazard requires a separate storage area for flammable cleaners. Despite this precaution, you pay higher insurance rates when these flammable materials are on your property.

They are costly to dispose. After solvent based cleaners become loaded with grease and oils, they must be stored in a separate, secured area and a costly disposal company must be called in to carry these materials away. They are then either burned, (contaminating our air) or dumped in hazardous waste sites (which then contaminate the ground and drinking waters).

They have limited effectiveness. Most cleaners won't work on a wide range of applications. Manufacturers think they can sell more product by making you buy a special product for each cleaning job. Maintenance costs and storage problems increase when you carry a large variety of cleaners in your inventory.

HOW DO I KNOW IF MY PRESENT CLEANERS ARE HAZARDOUS?

Very easy. First, look at the label. If it says it contains any of the hazardous materials such as caustic, petroleum distillates, chlorinated solvents, acids, metasilicates, alcohols, or others listed on page 8 of this Report, then you know it is hazardous.

Next ask for and get the Material Safety Data Sheet (MSDS). By law, you are entitled to see an MSDS for every product you use. See your supervisor or contact the manufacturer directly. Look especially at Section II of the MSDS and note the reference to any hazardous materials.

IS THERE A SOLUTION TO THESE PROBLEMS?

Yes.

As a direct result of a serious industrial accident, a safer high-efficiency cleaner was developed---CLEANER NO. 10. Wide acceptance by many of the Fortune 500 companies have repeatedly proven CLEANER NO. 10 can replace many of the hazardous cleaners and degreasers now being used.

0908-1877

Material Safety Data Sheet

May be used to comply with
 OSHA's Hazard Communication Standard,
 29 CFR 1910.1200. Standard must be
 consulted for specific requirements.

U.S. Department of Labor

Occupational Safety and Health Administration
 (Non-Mandatory Form)
 Form Approved
 OMB No. 1218-0072



IDENTITY (As Used on Label and List)

CLEANER NO. 10; 10LP; 10RI

Note: Blank spaces are not permitted. If any item is not applicable, or no information is available, the space must be marked to indicate that.

Section I

Manufacturer's Name

Sky Products Co.

Emergency Telephone Number

(617) 535-4545; (617) 633-7988

Address (Number, Street, City, State, and ZIP Code)

110 Goodale Street

Telephone Number for Information

(617) 535-4545

Date Prepared

23 August, 1986

Peabody, MA 01960

Signature of Preparer (optional)

Section II — Hazardous Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity; Common Name(s))	OSHA PEL	ACGIH TLV	Other Limits Recommended	% (optional)
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None. Contains no materials listed in Massachusetts "Right to Know" Substance List.

- 1. Considered "non-toxic". When animal tested in accordance with 29CFR 1910.1200, a single oral dose of 5000 mg/kg (ten-times the allowable dose) produced no fatalities. All animals gained weight.**
- 2. When tested in accordance with 16CFR1500.42, Eye Irritation, there was initial irritation, but all was cleared up by 72 hours with no flushing.**
- 3. Test Reports available on request from factory.**

Section III — Physical/Chemical Characteristics

Boiling Point	210°F	Specific Gravity (H ₂ O = 1)	1.12
Vapor Pressure (mm Hg.)	17.3	Melting Point	25°F
Vapor Density (AIR = 1)	> 1	Evaporation Rate (Butyl Acetate = 1)	< 1
Solubility in Water	100% complete		
Appearance and Odor	pH=10.5		

Clear, blue liquid; pleasant citrus odor

Section IV — Fire and Explosion Hazard Data

Flash Point (Method Used)	Flammable Limits	LEL	UEL
None (COC); non-flammable		none	none
Extinguishing Media			
Not applicable; non-flammable			
Special Fire Fighting Procedures			
Not applicable; non-flammable			

Unusual Fire and Explosion Hazards

None; non-flammable; non-explosive

TRW-00512

Section V — Reactivity Data

Stability	Unstable		Conditions to Avoid
	Stable	X	None; chemically stable.

Incompatibility (Materials to Avoid)

None.

Hazardous Decomposition or Byproducts

None.

Hazardous Polymerization

May Occur

Conditions to Avoid

Will Not Occur

X

None.

Section VI — Health Hazard Data

Route(s) of Entry:

Inhalation?

X

Skin?

X

Ingestion?

X

Health Hazards (Acute and Chronic)

Acute: Temporary eye irritation from direct contact with undiluted product.
See Section II on reverse page.

Chronic: None known.

Carcinogenicity:

NTP?

No.

IARC Monographs?

No.

OSHA Regulated?

No.

As determined by analysis of data supplied by component manufacturers.

Signs and Symptoms of Exposure

Eye contact causes irritation. Large amount swallowing causes stomach upset.**Long-time skin exposure may cause temporary redness.**

Medical Conditions

Generally Aggravated by Exposure **Splashes in eye will cause eye irritation.**

Emergency and First Aid Procedures

For eye splash, flush with water for 15 minutes. (See Section II on reverse page). For swallowing; give 2 glasses water, induce vomiting. Call physician.

Section VII — Precautions for Safe Handling and Use

Steps to Be Taken in Case Material Is Released or Spilled

Flush with water into drainage system. Product is completely soluble and biodegradable in water. Consult local authorities.

Waste Disposal Method

Flush with water into drainage system. Product is completely soluble and biodegradable in water. Consult local authorities.

Precautions to Be Taken in Handling and Storing

As with all cleaners, wear eye goggles or face shield. Freezes at 20°F, and can be thawed and used without remixing.

Other Precautions

Do not store in bare steel containers as color will be affected. Use only factory approved liners, plastic or stainless steel.

Section VIII — Control Measures

Respiratory Protection (Specify Type)

Not normally needed.

Ventilation

Local Exhaust

Not normally needed.

Special

None.

Mechanical (General)

Not needed.

Other

None.

Protective Gloves

Not normally needed.

Eye Protection

Goggles/face shield as with all cleaners.

Other Protective Clothing or Equipment

Not normally needed.

Work/Hygienic Practices

Normal professional work habits should always be observed.

WHAT IS CLEANER NO. 10?

It is proven, multi-function cleaner and degreaser in concentrated form. It is safer for your health and more economical than other cleaners. Depending on your particular job, you add water to get the lowest possible operating cost. For example, a mixture of 300 parts water (less than 1 tablespoon in a gallon) will do many light cleaning tasks. Full strength, CLEANER NO. 10 will remove the heaviest grease and soils, but still pose no hazard to the user.

WHAT MAKES CLEANER NO. 10 SO GOOD?

CLEANER NO. 10 solves most of the problems and eliminates the dangers caused by other cleaners.

It is non-hazardous, according to the current requirements of OSHA (Occupational Safety and Health Administration).

It is non-flammable, will not burn at any temperature.

It is biodegradable, making disposal easier, even in the face of strict EPA (Environmental Protection Agency) and local laws.

DOES THE SAFER CLEANER NO. 10 COST MORE?

No. In fact it is usually less costly when properly diluted, than most other cleaners.

HOW DO I KNOW THAT CLEANER NO. 10 WILL WORK FOR ME?

You don't. That's why the makers of CLEANER NO. 10 offer a no-risk, money back plus guarantee. Use CLEANER NO. 10 for 30 days. If you are not satisfied with it as the best overall cleaner you have ever used, ship it back. We will pay all shipping costs and give you a full refund.

ARE THERE JOBS THAT CLEANER NO. 10 WILL NOT DO?

Yes. Hazardous cleaners are used in industry on extremely stubborn soils. The safer CLEANER NO. 10 may take more time than you are willing to spend to remove these soils. However, the health and economical benefits using CLEANER NO. 10 may offset the extra time that may be needed on these unusual cleaning problems.

Cleaning conditions vary. That's why we offer our full satisfaction guarantee. It lets you try CLEANER NO. 10 in your own place under your own conditions.

CONCLUSION.

TIRED OF TRADING SAFETY FOR EFFECTIVENESS?

Switch to CLEANER NO. 10 and get:

- *Safety
- *Effectiveness
- *Economy
- *Ease of disposal

See for yourself: take advantage of our full service guarantee to try CLEANER NO. 10 for 30 days. If not completely satisfied, return the unused portion. We will gladly give you a full refund and reimburse all shipping costs.

GUARANTEE CERTIFICATE

If not satisfied after using CLEANER NO. 10 for 30 days, return the unused portion for a refund of the full purchase price. The makers of CLEANER NO. 10 will also assume all shipping costs.

This is a full service guarantee with no restrictions - - not a limited warranty as offered by most manufacturers.



Officials, wearing protective gear, tour a contaminated area of a town where a high incidence of cancer and leukemia were thought to be related to well water polluted by hazardous waste dumping.

Whenever you store or use or dispose of a hazardous chemical, a spill has drastic consequences. If a leaking drum hospitalized three policemen, and disposal threatened the health and lives of an entire community, what could the chemicals used in your business do to you and your employees?

THINK...and use non-hazardous CLEANER NO. 10.



A single leaking drum of this hazardous chemical spill hospitalized three policemen called in to investigate the spill. Firefighters had to wear full protective gear and respiratory masks to remove the drum.

TRW-00516

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing,
Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

Form Approved
OMB No. 44-R1367

SECTION I

MANUFACTURER'S NAME Sky Products Co.		EMERGENCY TELEPHONE NO.
ADDRESS (Number, Street, City, State, and ZIP Code)		
CHEMICAL NAME AND SYNONYMS		TRADE NAME AND SYNONYMS CLEANER NO. 10
CHEMICAL FAMILY Detergent Cleaner	FORMULA Proprietary	

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV (Units)
This product contains no materials classed as hazardous.					"TLV"
This product contains no materials listed in the Massachusetts "Toxic and Hazardous Substances List".					

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	226	SPECIFIC GRAVITY (H ₂ O=1)	1.12
VAPOR PRESSURE (mm Hg.)	17.3	PERCENT VOLATILE BY VOLUME (%)	85
VAPOR DENSITY (AIR=1)	> 1	EVAPORATION RATE (Water = 1)	< 1
SOLUBILITY IN WATER	complete	pH =	10.5
APPEARANCE AND ODOR Clear, blue liquid; pleasant lemon odor			

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	None (open cup)	FLAMMABLE LIMITS	LeI	UHI
EXTINGUISHING MEDIA	Not applicable; non-flammable			
SPECIAL FIRE FIGHTING PROCEDURES	Not applicable			
UNUSUAL FIRE AND EXPLOSION HAZARDS				
None				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE	Greater than 500 ppm
EFFECTS OF OVEREXPOSURE	Prolonged contact with concentrate may result in slight redness for short period of time.
EMERGENCY AND FIRST AID PROCEDURES	Eye contact-flush with water for 15 minutes. Call physician. Swallow-give 2 glasses of water, induce vomiting. Call physician. Skin contact-flush with water.

SECTION VI - REACTIVITY DATA

STABILITY	UNSTABLE	CONDITIONS TO AVOID	None
	STABLE	X	
INCOMPATIBILITY (Materials to avoid) None			
HAZARDOUS DECOMPOSITION PRODUCTS None			
HAZARDOUS POLYMERIZATION	MAY OCCUR	CONDITIONS TO AVOID	None
	WILL NOT OCCUR	X	

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	Flush with water into drainage system.
WASTE DISPOSAL METHOD	Flush with water into drainage system.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)	None
VENTILATION	LOCAL EXHAUST SPECIAL None MECHANICAL (General) Satisfactory OTHER None
PROTECTIVE GLOVES	Plastic or rubber EYE PROTECTION Safety Glasses
OTHER PROTECTIVE EQUIPMENT	Eye Bath

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING	None
OTHER PRECAUTIONS	None

PAGE (2)
GPO 930-540

Form OSHA 20
Rev. May 72

TLV COMPARISON CHART
Source: American Conference of
Governmental Industrial Hygienists
SBN: 0-936712-54-6; 1985

HAZARDOUS ZONE		/ SAFETY ZONE
Carbon Tetrachloride (5)	*	/
Napthalene (10)	*	/
Ammonia (25)	*	/ CLEANER NO. 10
Butyl (25)	*	/ has no hazardous
Hexane (50)	**	/ chemicals.
Perchloroethylene (50)	**	/
Trichloroethylene (50)	**	/ Its TLV is
Methylene Chloride (100)	*****	/ well over 500
Stoddard Solvent (100)	*****	/ which makes it
Toluene (100)	*****	/ extremely safe.
Turpentine (100)	*****	/
Methyl Alcohol (200)	*****	/
Methyl Ethyl Ketone MEK (200)	*****	/
Petroleum Distillates (200)	*****	/
Gasoline (300)	*****	/
1,1,1 Trichloroethane (350)	*****	/
Isopropyl Alcohol (400)	*****	/
CLEANER NO. 10	*****	/

WHAT IS THE MSDS?

The Material Safety Data Sheet, sometimes called OSHA Form 20, must be prepared and furnished by every manufacturer of a product used today in the USA. By law, you are entitled to see a copy of this MSDS for every product you work with or are exposed to in your working area.

This sheet has several portions. Refer to the copy of the MSDS for CLEANER NO. 10 on page 7 of this Report.

Note especially Section II where all hazardous materials must be shown, along with their TLV numbers. See below for explanation of the TLV.

Note also the disposal procedures, the fire hazards, and spill or leak procedures. Knowledge of these items now could save your health or life later in an emergency.

WHAT SHOULD I KNOW ABOUT DECEPTIVE PRACTICES BEFORE READING THE MSDS?

Some manufacturers omit information in Section II and simply say "For further information consult the factory". Be suspicious if you see this--it may mean that there are hazards that the company would like to avoid discussing.

WHAT DOES "TLV" MEAN?

TLV is "Threshold Limit Value". and is usually associated with inhalation.

TLV is the concentration of substance vapor (expressed as "ppm" or parts per million) in air for a normal 8-hour workday, 40-hour workweek, to which nearly all workers may be repeatedly exposed, day after day, without adverse effect on health.

The more hazardous the substance, the less concentration is allowed, and therefore the TLV is lower.

OSHA classes any substance with a TLV less than 500 as "hazardous". A TLV greater than 500 is classed as "non-hazardous", such as CLEANER NO. 10.

Most chlorinated and petroleum based solvents have a TLV less than 500 and are therefore classed as "hazardous".

WHAT IS A HAZARDOUS SUBSTANCE?

This generally refers to a substance which causes a harmful reaction to the body from inhalation or skin contact, resulting in dizziness, fainting, death, disease, cancer (carcinogens), or burns.

WHAT DOES FLAMMABILITY MEAN?

A product is rated for flammability depending on its Flash Point (the temperature of the product at which it will ignite if exposed to a flame.)

Products with a Flash Point less than 20F (-7C) are classed as "Extremely Flammable". Flash Points between 20F (-7C) and 100F (38C) are classed as "Flammable". Flash Points of any temperature above 100F (38C) are classed as "Combustible".

A product having no Flash Point whatsoever, no matter how high it is heated, is classed as "Non-Flammable", such as CLEANER NO. 10.

WHAT DOES CAUSTIC MEAN?

A Caustic is a substance which burns or eats away by chemical action. Caustic Soda is Sodium Hydroxide (also known as Lye). Caustic Potash is Potassium Hydroxide. Even solutions as low as 1% of either of these caustics can eat away your skin by permanently destroying the keratin, or outer protective layer.

Permanent blindness is usually the result of even momentary eye contact with caustics.

WHY DO OTHER CLEANERS CONTAIN HAZARDOUS MATERIALS?

Beacuse they are inexpensive.

Manufacturers know that most users do not take the time to become aware of the dangers of these products.

They also take advantage of the fact that most users are under pressure to get the job done quickly and "who cares about the worker?".

WHAT DOES CLEANER NO 10 CONTAIN?

It is water-based and contains a scientific blend of emulsifiers, coupling agents, detergents, bubbling suds, specialized builders, surfactants, fragrances, and Certified FD&C colors.

Catalyst HITELV, a scientific blend of high efficiency ingredients enhances the cleaning power of CLEANER NO. 10.

Emulsifiers break dirt and grease into small particles.

Coupling agents allow grease and water molecules to combine so they can easily be washed away with plain water.

Detergents keep dirt and grease particles suspended in solution so they are completely removed. No oily film remains on the surface, and new dirt will not form so quickly. This allows a longer time between cleaning jobs.

Bubbling suds act as "automatic scrubbers". Each time a bubble breaks it scrubs off a little more grease and dirt. Thus CLEANER NO. 10 automatically reduces the need for scrubbing--saving your labor costs and time.

Specialized builders clean dirt from hard surfaces, reducing need for scrubbing. They also condition the water eliminating need for water softeners.

Surfactants are SURFace ACTIVE Agents which lower the dynamic surface tension of your cleaning solution, making it wetter to penetrate fast, giving CLEANER NO. 10 the ability to work faster.

Coloring agent is added so you can see the dilution you are using for each job. Even though the amount of coloring agent is less than .005%, we use only FD&C agents as other agents are usually hazardous. Thus we guard your health all we can.

WHY DOESN'T CLEANER NO. 10 CONTAIN
HAZARDOUS MATERIALS?

Because the makers of non-hazardous
CLEANER NO. 10 have discovered a way
to blend several non-hazardous
substances in a way which produces
the same effective cleaning power as
the hazardous cleaners.

HOW CAN CLEANER NO 10 STILL BE
PRICED COMPETITIVELY?

Because CLEANER NO. 10 is
non-hazardous, the manufacturing
methods do not require overly
expensive, highly sophisticated,
special safety equipment. Standard
safety equipment suffices. Our
insurance rates are also lower.

Because CLEANER NO. 10 almost sells
itself, no expensive sales force
pyramid is needed.

Your costs can likewise be lowered
if you use CLEANER NO. 10 in place
of hazardous cleaners starting now.

SINCE TOXINS (POISONOUS SUBSTANCES)
CAN CAUSE HARM, WOULDN'T I BE SAFE
USING WEAKER SOLUTIONS?

Surprisingly, scientific literature
reports the opposite. According to
scientist Sherridan Stock in New
Scientist (October 2, 1980), "Low
level exposure to a toxin can
sometimes be more toxic than
exposure to a higher level of the
same toxin, possibly because the
higher dose kills target cells
instead of setting pernicious
metabolic events in train."

YOU'VE READ THE FACTS.

Now, see for yourself. Take
advantage of our no-risk guarantee.
Try non-hazardous CLEANER NO. 10. If
not satisfied after 30 days, return
the unused portion. We will issue a
full refund and reimburse you for
all shipping costs.

You can't lose. So order CLEANER
NO. 10 today and start using the
safest, most economical cleaner of
all.

CLEANER NO. 10

THE SAFER CLEANER

NO PETROLEUM BASED SOLVENTS

NO FIRE HAZARD (will not burn)

NO CHLORINATED SOLVENTS

NO AMMONIA

NO CAUSTICS

NO BUTYL

NO HAZARDOUS SUBSTANCES

Nothing but safer chemicals blended in a state of the art formula to clean safer and better at low cost.

SAVES YOUR HEALTH

Non-hazardous per OSHA

SAVES YOUR MONEY

You buy concentrate — not water

SAVES THE ENVIRONMENT

Biodegradable — dispose down drain

0908-1887

TRW-00521

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

FORM APPROVED
OMB No. 44-R1387

MATERIAL SAFETY DATA SHEET

REVISED

JANUARY 7, 1987

Required under USDL Safety and Health Regulations for Ship Repairing,
Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME ENVIRONMENTAL SPECIALTIES CORPORATION		EMERGENCY TELEPHONE NO. (401) 781-6770
ADDRESS (Number, Street, City, State, and ZIP Code) 860 EDDY STREET, PROVIDENCE, RI 02905		
CHEMICAL NAME AND SYNONYMS INDUSTRIAL SOLVENT CLEANER		TRADE NAME AND SYNONYMS ISC-108 CAS#06264
CHEMICAL FAMILY LIQUID ALKALI CLEANING COMPOUND	FORMULA	

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS 1,1,1, TRICHLOROETHANE	0.4%	350	FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV (Units)
NOT APPLICABLE					

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	212	SPECIFIC GRAVITY (H ₂ O=1)	1.015
VAPOR PRESSURE (mm Hg.)	N/A	PERCENT, VOLATILE BY VOLUME (%)	90%
VAPOR DENSITY (AIR=1)	N/A	EVAPORATION RATE (H ₂ O = 1)	1.0
SOLUBILITY IN WATER	INFINITE	pH 2% SOLUTION	9.45
APPEARANCE AND ODOR: GREEN, MILD SOLVENT LIKE ODOR			

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	NONE	FLAMMABLE LIMITS	None	Let	Uel
EXTINGUISHING MEDIA	NONE				
SPECIAL FIRE FIGHTING PROCEDURES	NONE				
UNUSUAL FIRE AND EXPLOSION HAZARDS	NONE				

TRW-00522

*To clean press if oil
pvt to customer*

MATERIAL SAFETY DATA SHEET

Stewart-Hall Chemical Corp.

222 Washington St., Mt. Vernon, NY 10553

Date Prepared: 9/09/88

Section I

MANUFACTURER'S NAME: Stewart-Hall Chemical Corp.
ADDRESS: 222 Washington St., Mt. Vernon, NY 10553
EMERGENCY PHONE #: 914-668-6300
CHEMICAL NAME & SYNONYMS: Industrial cleaner
TRADE NAME & SYNONYMS: **CLEANMASTER-C**
CHEMICAL FAMILY: Organic compound
FORMULA: See Below

Section II - INGREDIENTS

	C.A.S.#	W/V	%
Ethylene glycol butyl ether	111-76-2		<5.0
Propylene glycol methyl ether	20324-33-8		<5.0
Sodium metasilicate	6834-92-0		<5.0

Contains no other substances found on the "Hazardous Substance" List.

Section III- PHYSICAL DATA

BOILING POINT: (°F) 212
SPECIFIC GRAVITY: (Water=1) 1.03
PERCENT VOLATILE BY VOLUME: 92
VAPOR PRESSURE: (mm Hg.) NA
VAPOR DENSITY: (Air=1) NA
EVAPORATION RATE: (water =1) 1
SOLUBILITY IN WATER: 100%
APPEARANCE AND ODOR: Clear straw colored. Mild odor.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method Used): NA
FLAMMABLE LIMITS:
EXTINGUISHING MEDIA: NA
SPECIAL FIRE FIGHTING PROCEDURES: NA
UNUSUAL FIRE & EXPLOSION HAZARDS: None

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: Not tested.

EFFECTS OF OVEREXPOSURE: Headache, nausea, dizziness. Vapor may be irritating to breathe alkaline material.

EMERGENCY & FIRST AID PROCEDURES:

Inhalation - remove to fresh air. In case of contact with skin or eyes, immediately flush with plenty of water. Get medical care for eyes. For ingestion, call physician immediately.

SECTION VI - REACTIVITY DATA

STABILITY: STABLE ☒ UNSTABLE _____

CONDITIONS TO AVOID:

INCOMPATIBILITY: Acids

HAZARDOUS DECOMPOSITION PRODUCTS: None.

HAZARDOUS POLYMERIZATION: MAY OCCUR _____ WILL NOT OCCUR ☒

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Pick up with absorbent & dispose of in proper waste site. Flush remainder with water.

WASTE DISPOSAL METHOD: Any proper waste site for chemicals non-hazardous.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION: (Specify type): None if properly ventilated.

VENTILATION:

Local Exhaust: ☒ Special: _____
Mechanical (General) ☒ Other _____

PROTECTIVE GLOVES: Rubber

EYE PROTECTION: Goggles

OTHER PROTECTIVE EQUIPMENT:

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING & STORING: Avoid prolonged inhalation.

OTHER PRECAUTIONS: Keep from freezing

CLEANMASTER-C

Page 2

0908-1890

TRW-00524

NFPA Code
Health 2
Flammability 3
Reactivity 0

MATERIAL SAFETY DATA SHEET

PRODUCT CODE: 6882

DATE OF PREP. June 21, 1989

Section I

MANUFACTURER: RAFFI & SWANSON, INC.
100 EAMES STREET
WILMINGTON, MA 01887

EMERGENCY TELEPHONE NO.: 617-933-4200

TRADE NAME: None

MANUFACTURERS' CODE IDENTIFICATION:

Clear Acrylic Bake Enamel 6882

PRODUCT CLASS: Solvent Based Compound

THIS PRODUCT IS A MIXTURE CONTAINING ONE OR MORE HAZARDOUS INGREDIENTS.

INFORMATION ON THE COMPOSITION OF RAFFI & SWANSON, INC. PRODUCTS IS CONFIDENTIAL PROPRIETARY INFORMATION AND IS PROVIDED SOLELY TO AID IN SAFE HANDLING OF THESE MATERIALS. USE OR DISCLOSURE FOR ANY OTHER PURPOSE IS EXPRESSLY FORBIDDEN.

Section II — HAZARDOUS INGREDIENTS

INGREDIENTS	CAS NUMBER	APPROX PERCENT BY WEIGHT	TLV		LEL % BY VOL	VAPOR PRESSURE mm of Hg
			PPM	mg/M ³		
Xylol †	1330-20-7	23	100		1.0	5.9
Petroleum Solvent Naphtha (Aromatic 100)	64742-95-6	20	50		0.9	<10
Propylene Glycol Methyl Ether Acetate (Dowanol PM Acetate)	108-65-6	12	None Est.		1.5	3.7
n-Butyl Alcohol-skin †	71-36-3	6	50		1.4	4.3
Formaldehyde *C* †	50-00-0	0.6	1		--Not Applicable--	

† Subject to the reporting requirements of EPA Reg. 40 CFR 372 (SARA Title III, Sec. 313).
C indicates a carcinogen or suspect carcinogen according to ACGIH, OSHA, NTP or IARC.

Section III — PHYSICAL DATA

EVAPORATION RATE: ☐ FASTER ☒ SLOWER, THAN ETHER

BOILING RANGE: 243°-344°F PERCENT VOLATILE BY VOL: 68%

VAPOR DENSITY: ☒ HEAVIER ☐ LIGHTER, THAN AIR

WEIGHT PER GAL: 8.2#

Section IV — FIRE AND EXPLOSION HAZARD DATA

FLAMMABILITY CLASSIFICATION:

FLASH POINT (closed cup): 81°F lowest
flashing component

LEL: 0.9%

DOT: Flammable Liquid

OSHA: Flammable Liquid-Class IB

EXTINGUISHING MEDIA: Carbon dioxide, dry chemical or foam.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Keep containers tightly closed. Isolate from heat, sparks and open flame. Do not apply to hot surfaces.
Closed containers may explode when exposed to extreme heat.

SPECIAL FIRE FIGHTING PROCEDURES: Water may be ineffective. Water may be used to cool closed containers. Irritating or toxic gases may be present.
Use self-contained breathing apparatus.

TRW-00525

Section V — HEALTH HAZARD DATA (Based on data for individual ingredients)

THRESHOLD LIMIT VALUE - See Section II

EFFECTS OF OVEREXPOSURE

CHRONIC TOXICITY: See Section IX.

INHALATION: Vapor irritating to eyes, nose, and throat. Can cause headache, dizziness, nausea, weakness, loss of consciousness.
Prolonged overexposure may cause permanent injury.

SKIN: Penetrates skin.

Prolonged and repeated contact may cause drying of the skin, and absorption of harmful amounts.

EYE CONTACT: Burning and irritation.

INGESTION: Do not take internally. May cause nausea, vomiting, diarrhea and other toxic effects.

EMERGENCY AND FIRST AID PROCEDURES

INHALATION: Provide fresh air. Give artificial respiration or oxygen if necessary. CALL A PHYSICIAN.

SKIN: Wash thoroughly with soap and water. Remove contaminated clothing and shoes. Wash clothes thoroughly before re-use.

EYE CONTACT: Flush with water for at least 15 minutes. SEE PHYSICIAN.

INGESTION: DO NOT INDUCE VOMITING.

If vomiting occurs spontaneously, keep head below hips to prevent aspiration of liquid into lungs. CALL A PHYSICIAN.

Section VI — REACTIVITY DATA

STABILITY: ☐ UNSTABLE ☒ STABLEHAZARDOUS POLYMERIZATION: ☐ MAY OCCUR ☒ WILL NOT OCCUR

HAZARDOUS DECOMPOSITION PRODUCTS: Combustion produces carbon monoxide and carbon dioxide. Unidentified organic compounds may be formed.

MATERIALS AND CONDITIONS TO AVOID: Strong acids, strong alkalis, strong oxidizers.

Section VII — SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Remove all sources of ignition. Avoid breathing vapors. Ventilate area. Remove with inert absorbent and non-sparking tools.WASTE DISPOSAL METHOD: Incinerate in approved facility. Do not incinerate closed containers. Dispose in accordance with local, state and federal regulations.

Section VIII — SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION: Avoid breathing concentrated vapors or overspray particles if sprayed. In confined or poorly ventilated areas, use NIOSH approved mask with chemical canister or supplied air.VENTILATION: Provide general mechanical ventilation or local exhaust ventilation sufficient to keep concentration of solvent vapors below 50 PPMPROTECTIVE GLOVES: Use chemical resistant, impervious gloves for **contact**.EYE PROTECTION: Safety goggles or face shield where splashes can occur.OTHER PROTECTIVE EQUIPMENT:

Section IX — SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: ☒ FLAMMABLE ☐ COMBUSTIBLE

Keep in closed containers. Avoid sparks or flame when handling. Can be stored under ambient conditions. Keep closures tight and containers upright to prevent leakage.

OTHER PRECAUTIONS: Avoid contact with the skin. Use good personal hygiene practices. Wash hands thoroughly before eating/drinking/smoking/using toilet facilities.

Inhalation of formaldehyde has been shown to cause cancer in laboratory animals.

TRW-00526

BOWMAN DISTRIBUTION MATERIAL SAFETY DATA SHEET

SECTION I

PRODUCT NAME CLEAR ACRYLIC COATING		BOWMAN PART NO. 24723 (page 1 of 2)
SUPPLIER Bowman Distribution, Barnes Group Inc.		EMERGENCY TELEPHONE NO. (216) 333-7200
ADDRESS 850 East 72nd Street, Cleveland, OH 44103		DATE 4/25/86
HAZARDOUS MATERIAL DESCRIPTION, PROPER SHIPPING NAME, HAZARD CLASS, HAZARD ID NO. (49 CFR 172.101) Aerosol Spray Paint, Consumer Commodity, ORM-D		
ADDITIONAL HAZARD CLASSES (as applicable) N.A.		
CHEMICAL FAMILY N.A.	FORMULA X9435	

SECTION II - HAZARDOUS INGREDIENTS

CAS REGISTRY NO.	%W	%V	CHEMICAL NAME(S)	TLV PPM Mg/M ³	Listed as a Carcinogen in NTP, IARC or OSHA 1910(z) (specify)
1330-20-7	35-40		Xylene	100 435	No
67-64-1	30-35		Acetone	750 1780	No
—	15		Propellant: Propane/Isobutane/n-Butane	— —	No

SECTION III - PHYSICAL DATA

BOILING POINT 133-281 °F _____ °C	SPECIFIC GRAVITY (H ₂ O = 1)	.84	
VAPOR PRESSURE 188 @ _____ °F 20 °C <input checked="" type="checkbox"/> mm Hg <input type="checkbox"/> psi	PERCENT VOLATILE BY VOLUME (%)	90	PERCENT SOLID BY WEIGHT (%) 10
VAPOR DENSITY (AIR = 1)	N.A.	EVAPORATION RATE (_____ = 1)	N.A.
SOLUBILITY IN WATER	N.A.	pH =	N.A.
APPEARANCE AND ODOR Paint, solvent odor.		MATERIAL IS: LIQUID	

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT 0 °F -18 °C	method used	FLAMMABLE LIMITS	LEL 1.1	UEL N.A.
EXTINGUISHING MEDIA Carbon Dioxide, Dry Chemical, or Alcohol Foam				
SPECIAL FIRE FIGHTING PROCEDURES Water spray may be ineffective. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat. If water is used, fog nozzles are preferable.				
UNUSUAL FIRE AND EXPLOSION HAZARDS Vapors are heavier than air and may travel along the ground or may be moved by ventilation and ignited by pilot lights, other flames, sparks, heaters, smoking, electric motors or other ignition sources at locations distant from material handling point.				

SECTION V - HEALTH HAZARD DATA

EFFECTS OF OVEREXPOSURE - Conditions to avoid		THRESHOLD LIMIT VALUE See Section II
Excessive inhalation of vapors — can cause nasal and respiratory irritation.		PERMISSIBLE EXPOSURE LIMIT
dizziness, weakness, fatigue, nausea, headache, possible unconsciousness, and even asphyxiation.		OTHER LIMIT
PRIMARY ROUTES OF ENTRY Inhalation <input checked="" type="checkbox"/> Skin Contact <input type="checkbox"/> Other (specify)		
EMERGENCY AND FIRST AID PROCEDURES		
If affected, remove individual to fresh air. If breathing is difficult, administer oxygen. If breathing has stopped, give artificial respiration.		
Keep person warm, quiet and get medical attention.		

SECTION VI - REACTIVITY DATA

STABILITY	UNSTABLE	CONDITIONS TO AVOID	
	STABLE	X	Heat, sparks and open flame.
INCOMPATIBILITY (materials to avoid)			
Avoid contact with: strong oxidizing agents and heat.			
HAZARDOUS DECOMPOSITION PRODUCTS:			
N.A.			
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	N.A.

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	
Absorb liquid on paper, vermiculite, floor absorbent or other absorbent material and transfer to a closed container. Eliminate all ignition sources.	
WASTE DISPOSAL METHOD	
Material collected on absorbent material may be deposited in a posted toxic substance landfill in accordance with local, state and federal regulations.	
CERCLA (Superfund) REPORTABLE QUANTITY (in lbs)	
N.A.	
RCRA HAZARDOUS WASTE NO. (40 CFR 261.33)	
N.A.	
VOLATILE ORGANIC COMPOUND (VOC) (as packaged minus water)	<input checked="" type="checkbox"/> Theoretical <u>5.1</u> lb/gal
	<input type="checkbox"/> Analytical _____ lb/gal N.A.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (specify type)		
NIOSH/MSHA jointly approved self-contained breathing apparatus with a full face piece operated in pressure demand.		
VENTILATION	LOCAL EXHAUST (specify rate)	SPECIAL
	Sufficient to maintain exposure below TLV(s).	
	MECHANICAL (general) (specify rate)	OTHER
PROTECTIVE GLOVES (specify type)		EYE PROTECTION (specify type)
Chemical resistant gloves.		Chemical splash goggles in compliance with OSHA regulation.
OTHER PROTECTIVE EQUIPMENT		
N.A.		

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING	
Do not store in areas above 120° F or in direct sunlight or near heat or open flames.	
OTHER PRECAUTIONS	
Store large quantities in buildings protected for storage of NFPA Class 1C flammable liquids.	
TRW-00528	

Health 2
Flammability 3
Reactivity 0

MATERIAL SAFETY DATA SHEET

PRODUCT CODE: 6914
DATE OF PREP. June 21, 1989

Section I

MANUFACTURER: RAFFI & SWANSON, INC.
100 EAMES STREET
WILMINGTON, MA 01887

MANUFACTURERS' CODE IDENTIFICATION:
Clear Bake Enamel 6914

EMERGENCY TELEPHONE NO.: 617-933-4200

PRODUCT CLASS: •• Solvent Based Compound

TRADE NAME: None

THIS PRODUCT IS A MIXTURE CONTAINING ONE OR MORE HAZARDOUS INGREDIENTS.

INFORMATION ON THE COMPOSITION OF RAFFI & SWANSON, INC. PRODUCTS IS CONFIDENTIAL PROPRIETARY INFORMATION AND IS PROVIDED SOLELY TO AID IN SAFE HANDLING OF THESE MATERIALS. USE OR DISCLOSURE FOR ANY OTHER PURPOSE IS EXPRESSLY FORBIDDEN.

Section II — HAZARDOUS INGREDIENTS

INGREDIENTS	CAS NUMBER	APPROX. PERCENT BY WEIGHT	TLV		LEL % BY VOL	VAPOR PRESSURE mm of Hg
			PPM	mg/M ³		
Xylol †	1330-20-7	26	100		1.0	5.9
Propylene Glycol Methyl Ether Acetate (Dowanol PM Acetate)	108-65-6	11	None Est.		1.5	3.7
Petroleum Solvent Naphtha (Aromatic 100)	64742-95-6	11	50		0.9	<10
n-Butyl Alcohol-skin †	71-36-3	7	50		1.4	4.3
Toluol †	108-88-3	3	100		1.2	22
Formaldehyde *C* †	50-00-0	0.67	1		--Not Applicable--	

† Subject to the reporting requirements of EPA Reg. 40 CFR 372 (SARA Title III, Sec. 313).
C indicates a carcinogen or suspect carcinogen according to ACGIH, OSHA, NTP or IARC.

Section III — PHYSICAL DATA

EVAPORATION RATE: ☐ FASTER ☒ SLOWER, THAN ETHER
BOILING RANGE: 232°-344°F PERCENT VOLATILE BY VOL: 65%
VAPOR DENSITY: ☒ HEAVIER ☐ LIGHTER, THAN AIR
WEIGHT PER GAL: 8.32#

Section IV — FIRE AND EXPLOSION HAZARD DATA

FLAMMABILITY CLASSIFICATION: DOT: Flammable Liquid
OSHA: Flammable Liquid-Class IB
FLASH POINT (closed cup): 40°F lowest flashing component
LEL: 0.9%

EXTINGUISHING MEDIA: Carbon dioxide, dry chemical or foam.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Keep containers tightly closed. Isolate from heat, sparks and open flame. Do not apply to hot surfaces.
Closed containers may explode when exposed to extreme heat.

SPECIAL FIRE FIGHTING PROCEDURES: Water may be ineffective. Water may be used to cool closed containers. Irritating or toxic gases may be present.
Use self-contained breathing apparatus.

TRW-00529

Section V — HEALTH HAZARD DATA (Based on data for individual ingredients)**THRESHOLD LIMIT VALUE** - See Section II**EFFECTS OF OVEREXPOSURE****CHRONIC TOXICITY:** See Section IX.**INHALATION:** Vapor irritating to eyes, nose, and throat. Can cause headache, dizziness, nausea, weakness, loss of consciousness. Prolonged overexposure may cause permanent injury.**SKIN:** Penetrates skin.

Prolonged and repeated contact may cause drying of the skin, and absorption of harmful amounts.

EYE CONTACT: Burning and irritation.**INGESTION:** Do not take internally. May cause nausea, vomiting, diarrhea and other toxic effects.**EMERGENCY AND FIRST AID PROCEDURES****INHALATION:** Provide fresh air. Give artificial respiration or oxygen if necessary. CALL A PHYSICIAN.**SKIN:** Wash thoroughly with soap and water. Remove contaminated clothing and shoes. Wash clothes thoroughly before re-use.**EYE CONTACT:** Flush with water for at least 15 minutes. SEE PHYSICIAN.**INGESTION:** DO NOT INDUCE VOMITING.

If vomiting occurs spontaneously, keep head below hips to prevent aspiration of liquid into lungs. CALL A PHYSICIAN.

Section VI — REACTIVITY DATA**STABILITY:** ☐ UNSTABLE ☒ STABLE**HAZARDOUS POLYMERIZATION:** ☐ MAY OCCUR ☒ WILL NOT OCCUR**HAZARDOUS DECOMPOSITION PRODUCTS:** Combustion produces carbon monoxide and carbon dioxide. Unidentified organic compounds may be formed.**MATERIALS AND CONDITIONS TO AVOID:** Strong acids, strong alkalis, strong oxidizers.**Section VII — SPILL OR LEAK PROCEDURES****STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:** Remove all sources of ignition. Avoid breathing vapors. Ventilate area. Remove with inert absorbent and non-sparking tools.**WASTE DISPOSAL METHOD:** Incinerate in approved facility. Do not incinerate closed containers. Dispose in accordance with local, state and federal regulations.**Section VIII — SPECIAL PROTECTION INFORMATION****RESPIRATORY PROTECTION:** Avoid breathing concentrated vapors or overspray particles if sprayed. In confined or poorly ventilated areas, use NIOSH approved mask with chemical canister or supplied air.**VENTILATION:** Provide general mechanical ventilation or local exhaust ventilation sufficient to keep concentration of solvent vapors below 50 PPM**PROTECTIVE GLOVES:** Use chemical resistant, impervious gloves for contact.**EYE PROTECTION:** Safety goggles or face shield where splashes can occur.**OTHER PROTECTIVE EQUIPMENT:****Section IX — SPECIAL PRECAUTIONS****PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING:** ☒ FLAMMABLE ☐ COMBUSTIBLE

Keep in closed containers. Avoid sparks or flame when handling. Can be stored under ambient conditions. Keep closures tight and containers upright to prevent leakage.

OTHER PRECAUTIONS: Avoid contact with the skin. Use good personal hygiene practices. Wash hands thoroughly before eating/drinking/smoking/using toilet facilities.

Inhalation of formaldehyde has been shown to cause cancer in laboratory animals.

TRW-00530

Health 2
Flammability 3
Reactivity 0

MATERIAL SAFETY DATA SHEET

PRODUCT CODE: 3500
DATE OF PREP. March 9, 1989

Section I

MANUFACTURER: RAFFI & SWANSON, INC.
100 EAMES STREET
WILMINGTON, MA 01887

MANUFACTURERS' CODE IDENTIFICATION:

Clear Lacquer 3500

EMERGENCY TELEPHONE NO.: 617-933-4200

PRODUCT CLASS:

Solvent Based Compound

TRADE NAME: None

THIS PRODUCT IS A MIXTURE CONTAINING ONE OR MORE HAZARDOUS INGREDIENTS.

INFORMATION ON THE COMPOSITION OF RAFFI & SWANSON, INC. PRODUCTS IS CONFIDENTIAL PROPRIETARY INFORMATION AND IS PROVIDED SOLELY TO AID IN SAFE HANDLING OF THESE MATERIALS. USE OR DISCLOSURE FOR ANY OTHER PURPOSE IS EXPRESSLY FORBIDDEN.

Section II — HAZARDOUS INGREDIENTS

INGREDIENTS	CAS NUMBER	APPROX. PERCENT BY WEIGHT	TLV		LEL % BY VOL	VAPOR PRESSURE mm of Hg
			PPM	mg/M ³		
Xylol †	1330-20-7	33	100		1.0	5.9
Propylene Glycol Methyl Ether Acetate (Dowanol PM Acetate)	108-65-6	24	None Est.		1.5	3.7
Toluol †	108-88-3	20	100		1.2	22
n-Butyl Acetate	123-86-4	4	150		1.7	8
Isopropyl Alcohol	67-63-0	2	400		2.0	33
Butyl Benzyl Phthalate † (Santicizer 160)	85-68-7	1	Not Estab.		0.3	Not Applic.

† Subject to the reporting requirements of EPA Reg. 40 CFR 372 (SARA Title III, Sec. 313).
Mixture does not contain any known or suspect carcinogen according to ACGIH, OSHA, NTP or IARC.

Section III — PHYSICAL DATA

EVAPORATION RATE: ☐ FASTER ☒ SLOWER, THAN ETHER

VAPOR DENSITY: ☒ HEAVIER ☐ LIGHTER, THAN AIR

BOILING RANGE: 180°-295°F PERCENT VOLATILE BY VOL: 87%

WEIGHT PER GAL: 7.85#

Section IV — FIRE AND EXPLOSION HAZARD DATA

FLAMMABILITY CLASSIFICATION:

FLASH POINT (closed cup): 40°F lowest

LEL: 1.0%

DOT: Flammable Liquid

flashing component

OSHA: Flammable Liquid-Class IB

EXTINGUISHING MEDIA: Carbon dioxide, dry chemical or foam.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Keep containers tightly closed. Isolate from heat, sparks and open flame. Do not apply to hot surfaces.
Closed containers may explode when exposed to extreme heat.

SPECIAL FIRE FIGHTING PROCEDURES: Water may be ineffective. Water may be used to cool closed containers. Irritating or toxic gases may be present.
Use self-contained breathing apparatus.

TRW-00431

Section V — HEALTH HAZARD DATA (Based on data for individual ingredients)**THRESHOLD LIMIT VALUE** - See Section II**EFFECTS OF OVEREXPOSURE****CHRONIC TOXICITY:** Not known to produce chronic or cumulative effects with exposures within recommended guidelines.**INHALATION:** Vapor irritating to eyes, nose, and throat. Can cause headache, dizziness, nausea, weakness, loss of consciousness. Prolonged overexposure may cause permanent injury.**SKIN:** Brief contact not expected to be harmful.

Prolonged and repeated contact may cause drying of the skin, and absorption of harmful amounts.

EYE CONTACT: Burning and irritation.**INGESTION:** Do not take internally. May cause nausea, vomiting, diarrhea and other toxic effects.**EMERGENCY AND FIRST AID PROCEDURES****INHALATION:** Provide fresh air. Give artificial respiration or oxygen if necessary. CALL A PHYSICIAN.**SKIN:** Wash thoroughly with soap and water. Remove contaminated clothing and shoes. Wash clothes thoroughly before re-use.**EYE CONTACT:** Flush with water for at least 15 minutes. SEE PHYSICIAN.**INGESTION:** DO NOT INDUCE VOMITING.

If vomiting occurs spontaneously, keep head below hips to prevent aspiration of liquid into lungs. CALL A PHYSICIAN.

Section VI — REACTIVITY DATA**STABILITY:** ☐ UNSTABLE ☒ STABLE**HAZARDOUS POLYMERIZATION:** ☐ MAY OCCUR ☒ WILL NOT OCCUR**HAZARDOUS DECOMPOSITION PRODUCTS:** Combustion produces carbon monoxide and carbon dioxide. Unidentified organic compounds may be formed.**MATERIALS AND CONDITIONS TO AVOID:** Strong acids, strong alkalis, strong oxidizers.**Section VII — SPILL OR LEAK PROCEDURES****STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:** Remove all sources of ignition. Avoid breathing vapors. Ventilate area. Remove with inert absorbent and non-sparking tools.**WASTE DISPOSAL METHOD:** Incinerate in approved facility. Do not incinerate closed containers. Dispose in accordance with local, state and federal regulations.**Section VIII — SPECIAL PROTECTION INFORMATION****RESPIRATORY PROTECTION:** Avoid breathing concentrated vapors or overspray particles if sprayed. In confined or poorly ventilated areas, use NIOSH approved mask with chemical canister or supplied air.**VENTILATION:** Provide general mechanical ventilation or local exhaust ventilation sufficient to keep concentration of solvent vapors below ~~100~~ PPM**PROTECTIVE GLOVES:** Use chemical resistant, impervious gloves for prolonged or repeated contact.**EYE PROTECTION:** Safety goggles or face shield where splashes can occur.**OTHER PROTECTIVE EQUIPMENT:****Section IX — SPECIAL PRECAUTIONS****PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING:** ☒ FLAMMABLE ☐ COMBUSTIBLE

Keep in closed containers. Avoid sparks or flame when handling. Can be stored under ambient conditions. Keep closures tight and containers upright to prevent leakage.

OTHER PRECAUTIONS: Avoid prolonged and repeated contact with the skin. Use good personal hygiene practices. Wash hands thoroughly before eating/drinking/smoking/using toilet facilities.

TRW-00532

Southern Coatings
P.O. Box 180
Sumter, SC 29150
EMERGENCY PHONE NO. 803-775-6351
INFORMATION PHONE NO. 803-775-6351

Experimental Dept 717
No Longer
12/13/86

APPROVED

NOV 25 1986

MATERIAL SAFETY DATA SHEET

ENVIRONMENTAL
ENGINEERING

SECTION I

DATE OF PREPARATION 11/20/86

TRADE NAME CLEAR POLYESTER ENL

MANUFACTURER CODE ID. 68-9815
9U-154-3

SECTION II - HAZARDOUS INGREDIENTS

INGREDIENT	CAS NO.	ALLOWABLE EXPOSURE LEVEL						VP MM HG @ 20 DEG.C
		PPM	MG/C.U.M.	FBR/CC	MPPCF	SKIN	MAC	
2-BUTOXYETHANOL	111-76-2	TLV 25	120	na	na	X	na	1
		PEL 50	240	na	na	X	na	
ISOBUTYL ACETATE	110-19-0	TLV 150	700	na	na	na	na	na
		PEL 150	700	na	na	na	na	
TOLUENE	108-88-3	TLV 100	375	na	na	na	na	22
		PEL 200		na	na	na	na	
ISOBUTYL ALCOHOL	78-83-1	TLV 50	150	na	na	na	na	10
		PEL 100	300	na	na	na	na	
FORMALDEHYDE	50-00-0	TLV 1	1.50	na	na	na	na	na
		PEL 3		na	na	na	na	
PROPYLENE GLYCOL	108-65-6	NONE ESTABLISHED		na	na	na	na	2
METHYL ETHER ACETATE				na	na	na	na	

na = Not applicable
X-SKIN = SKIN ABSORPTION MUST BE CONSIDERED AS A ROUTE OF EXPOSURE
X-MAC = ALLOWABLE EXPOSURE LEVEL SHOULD NOT BE EXCEEDED FOR ANY TIME PERIOD

SECTION III - HEALTH INFORMATION

EFFECTS OF SHORT TERM OVEREXPOSURE

SWALLOWING

Can cause gastrointestinal irritation, nausea, and vomiting. Aspiration of material into lung may cause chemical pneumonitis which can be fatal.

INHALATION

Inhalation of 2-butoxyethanol vapors, in the range of 300 to 600ppm, for several hours would be expected to cause respiratory irritation, narcosis, and damage to the kidney and liver.
May cause irritation of the respiratory system, and pulmonary edema which may be delayed in onset.

EYE

May cause transient corneal damage.

SKIN

Liquid material may be absorbed through the skin in harmful amounts.
May cause defatting and irritation of the skin.

EFFECTS OF REPEATED OVEREXPOSURE

Repeated overexposure to toluene may cause liver damage.
Reports have associated prolonged and repeated occupational overexposure to solvents with permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents may be harmful or fatal.

SIGNIFICANT LABORATORY DATA WITH POSSIBLE RELEVANCE TO HUMAN HEALTH.

Toluene has been found to cause kidney, lung and spleen damage in laboratory animals.
90 day subchronic inhalation studies of 2-butoxyethanol at 77ppm exposures to rats, resulted in blood damage. At 25 ppm no effects were observed.
Tetratology studies on rats exposed to 300ppm of 2-butoxyethanol resulted in maternal and embryo lethality. At 200ppm and 100ppm maternal, embryo, and fetotoxicity were observed. No effects were observed at 50ppm.
Formaldehyde is listed as a potential carcinogen by the National Toxicology Program. The American Medical Association has concluded that the principal effect of formaldehyde on humans is sensory irritation to the eyes, nose, and throat. The AMA stated "no nasal tumors that can be decisively attributed to formaldehyde have occurred in humans, nor has damage to body sites distant from the site of exposure been evident in humans."

SECTION IV - FIRST AID AND EMERGENCY PROCEDURES

SWALLOWING

If swallowed call Poison Control Center, Hospital Emergency Room, or Physician immediately.

INHALATION

Remove to fresh air immediately. If breathing has stopped, give artificial respiration.

RW-00533

0908-1899

SECTION IV - FIRST AID AND EMERGENCY PROCEDURES; (CONTINUED)

INHALATION

Normal respiration. Keep warm and quiet. Get medical attention immediately.

EYE

Flush with large amounts of water, lifting upper and lower lids occasionally. Continue for at least 15 minutes. Get medical attention.

SKIN

Remove contaminated clothing. Wash affected area with soap and water. Obtain medical attention if irritation persists.

NOTES TO PHYSICIAN

Ethylene glycol monobutyl ether is metabolized, at least in part, to butoxyacetic acid, and this substance is excreted in the urine. Excessive exposure by any route may result in erythropenia, reticulocytosis, granulocytosis, leukocytosis, fragility of erythrocytes and hematuria.

SECTION V - PHYSICAL DATA

BOILING RANGE 182 DEG.F. TO 350 DEG.F.

VAPOR DENSITY Heavier than air. % VOLATILE BY VOLUME 79

EVAPORATION RATE slower than ether. VOC 5.5 lb/gal less water 660 g/l less water CALCULATED

WEIGHT LB./GAL. 8.1 VOC 27.1 lb/gal solids 3252 g/l solids CALCULATED

SECTION VI - FIRE AND EXPLOSION DATA

NFPA FLAMMABILITY CLASSIFICATION FLAMMABLE LIQUID - CLASS 1B

FLASHPOINT 40 DEG.F., CALCULATED

EXTINGUISHING MEDIA

Use NFPA Class B fire extinguishers (carbon dioxide, all purpose dry chemical or alcohol foam) designed to extinguish flammable liquid fires. Polymer foam is preferred for large fires.

UNUSUAL FIRE AND EXPLOSION HAZARDS

During emergency conditions, overexposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent. Obtain medical attention.

WARNING! FLAMMABLE.

SPECIAL FIRE FIGHTING PROCEDURES

Firefighters should wear self-contained breathing apparatus. Water may be ineffective, but may be used to cool exposed containers to prevent pressure build-up and possible auto-ignition or explosion when exposed to extreme heat. If water is used, fog nozzles are preferable.

SECTION VII - REACTIVITY DATA

STABILITY

Normally stable.

CONDITIONS TO AVOID

Avoid excessive heat and sources of ignition.

INCOMPATIBILITY (MATERIALS TO AVOID)

Strong acids or alkaline materials.

HAZARDOUS DECOMPOSITION PRODUCTS

Burning, including when heated by welding or cutting, will produce smoke, carbon monoxide and carbon dioxide. In addition, oxides of nitrogen formaldehyde may be generated.

HAZARDOUS POLYMERIZATION

Will not occur

CONDITIONS TO AVOID

Keep away from heat sparks and flame.

SECTION VIII - ENVIRONMENTAL INFORMATION

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED

Wear respirators, eye, hand, and body protection appropriate for the size of the spill and the exposures encountered. Keep spectators away. Eliminate all ignition sources (flames, hot surfaces, and sources of electrical, static or frictional sparks). Dike and contain spill with inert material (e.g. sand, earth). Transfer liquids to covered metal containers for recovery or disposal, or remove with inert absorbent. Use only non-sparking tools. Place absorbent diking materials in covered metal containers for disposal. Prevent contamination of sewers, streams, and groundwater with spilled material or used absorbent.

WASTE DISPOSAL

Dispose in accordance with federal, state and local laws. Incinerate only in EPA permitted facility. Do not incinerate closed containers. Observe precautions for disposal of flammable materials. Contaminated absorbent may be disposed in a hazardous waste landfill. Dispose only in accordance with federal, state and local regulations.

RCRA CLASSIFICATION

This product, if discarded directly, would be classified a hazardous waste based on its ignitability characteristic, i.e. has a flash point of 140 deg. F. or less. The proper RCRA classification would be D001.

ENVIRONMENTAL HAZARDS

None known

SECTION IX - PERSONAL PROTECTION INFORMATION

RESPIRATORY PROTECTION

When spraying outdoors, or in open or well-ventilated areas, use NIOSH ap-

SECTION IX - PERSONAL PROTECTION INFORMATION; (CONTINUED)

RESPIRATORY PROTECTION

Provide mechanical filter respirator to remove overspray. In restricted ventilation areas, use NIOSH approved paint spray (combination chemical cartridge/mechanical filter) respirator to remove spray mist and organic vapors. In confined areas use a NIOSH approved air-supplied respirator. Refer to OSHA 29 CFR 1910.134 "Respiratory Protection".

VENTILATION

Provide general dilution and local exhaust ventilation in sufficient volume and pattern to keep concentration of hazardous ingredients listed in Section II below the lowest exposure limit stated. Remove decomposition products that are generated when welding, cutting, or brazing objects coated with this product. Vapors produced while drying or baking this product must be properly vented.

HAND PROTECTION

Solvent impermeable gloves are required for repeated or prolonged contact.

EYE PROTECTION

Wear safety spectacles.

OTHER PROTECTIVE EQUIPMENT

Eyewash facility, safety shower.

SECTION X - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Do not store above 95 degrees F. Store large quantities in compliance with OSHA 29CFR1910.106.

OTHER PRECAUTIONS

Do not take internally. Close container after each use.
Avoid skin contact.
Empty containers must not be washed and re-used for any purpose.
Containers should be grounded and bonded to the receiving container.
Do not weld, braze or cut on empty container.
Never use pressure to empty. Drum is not a pressure vessel.

SECTION XI - OTHER INFORMATION

US DOT INFORMATION

HAZARD CLASS: FLAMMABLE LIQUID

ID NUMBER: UN 1263

PROPER SHIPPING NAME: PAINT - FLAMMABLE LIQUID

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. WHILE THE INFORMATION IS BELIEVED TO BE RELIABLE, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THIS DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF. SINCE THE USE OF THIS INFORMATION AND THE CONDITIONS AND USE OF THIS PRODUCT ARE CONTROLLED BY THE USER, IT IS THE USER'S OBLIGATION TO DETERMINE THE CONDITIONS OF SAFE USE OF THE PRODUCT.

TRW CONTROLS &
FASTENERS GROUP
31 AMES STREET
CAMBRIDGE, MA

02142

TRW-00535

0908-1901

Southern Coatings
P.O. Box 160
Sumter, SC 29150

TRW CONTROLS &
FASTENERS GROUP
31 AMES STREET
CAMBRIDGE, MA

02142

Attn: Plant Manager/Director Safety

11/20/86

Dear Customer:

The enclosed Material Safety Data Sheet (MSDS) is being provided in conformance with the OSHA Hazard Communication Standard.

If someone other than the recipient is responsible for your hazard communication program, please forward it to his/her attention.

The standard requires you to maintain a file of MSDS for each hazardous material you use, and also to communicate and make this information available to your employees.

If you require additional information concerning this product, please contact your local salesperson.

We appreciate your patronage and look forward to serving you in the future.

Southern Coatings

0908-1902

TRW-00536

Health 1
Flammability 3
Reactivity 0

NFPA Code

MATERIAL SAFETY
DATA SHEET

PRODUCT CODE:

6045

DATE OF PREP.

April 19, 1989

Sept 717
230

Section I

MANUFACTURER: RAFFI & SWANSON, INC.
100 EAMES STREET
WILMINGTON, MA 01887

MANUFACTURERS' CODE IDENTIFICATION:

~~Clear Plate~~ 5045

EMERGENCY TELEPHONE NO.: 617-933-4200

PRODUCT CLASS: Solvent Based Compound

TRADE NAME: None

THIS PRODUCT IS A MIXTURE CONTAINING ONE OR MORE HAZARDOUS INGREDIENTS.

INFORMATION ON THE COMPOSITION OF RAFFI & SWANSON, INC. PRODUCTS IS CONFIDENTIAL PROPRIETARY INFORMATION AND IS PROVIDED SOLELY TO AID IN SAFE HANDLING OF THESE MATERIALS. USE OR DISCLOSURE FOR ANY OTHER PURPOSE IS EXPRESSLY FORBIDDEN.

Section II — HAZARDOUS INGREDIENTS

INGREDIENTS	CAS NUMBER	APPROX. PERCENT BY WEIGHT	TLV		LEL % BY VOL	VAPOR PRESSURE mm Hg
			PPM	mg/M ³		
Ethyl Alcohol	64-17-5	76	1000		4.3	45
Propylene Glycol Methyl Ether (Dowanol PM)	107-98-2	10	100		Not Avail.	8
Methyl Alcohol-Skin †	67-56-1	4	200		6.0	96
Formaldehyde *C*	50-00-0	0.03	1		--Not Applicable--	

† Subject to the reporting requirements of EPA Reg. 40 CFR 372 (SARA Title III, Sec. 313).
C indicates a carcinogen or suspect carcinogen according to ACGIH, OSHA, NTP or IARC.

Section III — PHYSICAL DATA

EVAPORATION RATE: ☐ FASTER ☒ SLOWER, THAN ETHER

VAPOR DENSITY: ☒ HEAVIER ☐ LIGHTER, THAN AIR

BOILING RANGE: 147°-248°F PERCENT VOLATILE BY VOL: 93%

WEIGHT PER GAL: 7.1#

Section IV — FIRE AND EXPLOSION HAZARD DATA

FLAMMABILITY CLASSIFICATION:

DOT: Flammable Liquid

OSHA: Flammable Liquid-Class IB

FLASH POINT (closed cup): 52°F lowest

LEL: 4.3%

flashing component

EXTINGUISHING MEDIA: Carbon dioxide, dry chemical or foam.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Keep containers tightly closed. Isolate from heat, sparks and open flame. Do not apply to hot surfaces.

Containers may explode when exposed to extreme heat.

SPECIAL FIRE FIGHTING PROCEDURES: Water may be ineffective. Water may be used to cool closed containers. Irritating or toxic gases may be present. Use self-contained breathing apparatus.

0908-1903

TRW-00537

Section V — HEALTH HAZARD DATA (Based on data for individual ingredients)

THRESHOLD LIMIT VALUE - See Section II

EFFECTS OF OVEREXPOSURE

CHRONIC TOXICITY: See Section IX.

INHALATION: Vapor irritating to eyes, nose, and throat. Can cause headache, dizziness, nausea, weakness, loss of consciousness. Prolonged overexposure may cause permanent injury.

SKIN: Penetrates skin.

Prolonged and repeated contact may cause drying of the skin, and absorption of harmful amounts.

EYE CONTACT: Burning and irritation.

INGESTION: Do not take internally. May cause nausea, vomiting, diarrhea and other toxic effects.

EMERGENCY AND FIRST AID PROCEDURES

INHALATION: Provide fresh air. Give artificial respiration or oxygen if necessary. CALL A PHYSICIAN.

SKIN: Wash thoroughly with soap and water. Remove contaminated clothing and shoes. Wash clothes thoroughly before re-use.

EYE CONTACT: Flush with water for at least 15 minutes. SEE PHYSICIAN.

INGESTION: DO NOT INDUCE VOMITING.

If vomiting occurs spontaneously, keep head below hips to prevent aspiration of liquid into lungs. CALL A PHYSICIAN.

Section VI — REACTIVITY DATA

STABILITY: ☐ UNSTABLE ☒ STABLEHAZARDOUS POLYMERIZATION: ☐ MAY OCCUR ☒ WILL NOT OCCUR

HAZARDOUS DECOMPOSITION PRODUCTS: Combustion produces carbon monoxide and carbon dioxide. Unidentified organic compounds may be formed.

MATERIALS AND CONDITIONS TO AVOID: Strong acids, strong alkalis, strong oxidizers.

Section VII — SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Remove all sources of ignition. Avoid breathing vapors. Ventilate area. Remove with inert absorbent and non-sparking tools.

WASTE DISPOSAL METHOD: Incinerate in approved facility. Do not incinerate closed containers. Dispose in accordance with local, state and federal regulations.

Section VIII — SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION: Avoid breathing concentrated vapors or overspray particles if sprayed. In confined or poorly ventilated areas, use NIOSH approved mask with chemical canister or supplied air.

VENTILATION: Provide general mechanical ventilation or local exhaust ventilation sufficient to keep concentration of solvent vapors below 100 PPM

PROTECTIVE GLOVES: Use chemical resistant, impervious gloves for contact.

EYE PROTECTION: Safety goggles or face shield where splashes can occur.

OTHER PROTECTIVE EQUIPMENT:

Section IX — SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: ☒ FLAMMABLE ☐ COMBUSTIBLE

Keep in closed containers. Avoid sparks or flame when handling. Can be stored under ambient conditions. Keep closures tight and containers upright to prevent leakage.

OTHER PRECAUTIONS: Avoid contact with the skin. Use good personal hygiene practices. Wash hands thoroughly before eating/drinking/smoking/using toilet facilities.

Inhalation of formaldehyde has been shown to cause cancer in laboratory animals.

Repeated overexposure to methanol may injure retina and optic nerve and cause blindness.

TRW-00538

MATERIAL SAFETY DATA SHEET

FOR COATINGS , RESINS AND RELATED MATERIALS

DATE OF PREPARATION 8/12/92

PAGE 1

MANUFACTURER'S NAME : MORTON COATINGS INC.
 ADDRESS : CHICOPEE FACILITY
 ADDRESS : 40 HAYNES CIRCLE
 CITY, STATE : CHICOPEE, MA 01020

EMERGENCY TELEPHONE NO. DAY: 413-592-4191 NIGHT: 800-424-9300
 INFORMATION TELEPHONE NO. DAY: 413-592-4191 NIGHT: 800-424-9300

SECTION I PRODUCT IDENTIFICATION

Manufacturer's Code Identification: D0224 Revision : 01
 Product Class: CLEAR COATING
 Trade Name: CLEAR PRIMER
 HMIS Information Health- 2 Flammability- 3
 Reactivity- 0 Personal Protective Equipment-

SECTION II HAZARDOUS INGREDIENTS

INGREDIENT					VAPOR PRESSURE MMHg @68DF	LEL	SARA 313	OTHER
MATERIAL DESCRIPTION	CAS#	% BY WEIGHT	OSHA-PEL	ACGIH-TLV				
METHANOL	67-56-1	20.01	200 PPM	200 PPM(S)	96.00	6.0	YES	(S)=SKIN; STEL 250 P
METHYL ISOBUTYL KETONE	108-10-1	30.00	50 PPM	50 PPM	28.00	1.4	YES	OSHA/ACGIH-STEL 75 P
TOLUENE	108-88-3	31.32	100 PPM	100 PPM	54.00	1.0	YES	OSHA/ACGIH STEL:150P
N-BUTANOL	71-36-3	3.48	50PPM-CEIL	50 PPM	4.39	1.5	YES	OSHA/ACGIH-SKIN NOTA

SECTION III PHYSICAL DATA

BOILING RANGE, DEG. F HIGH 360.0 LOW 148.0
 VAPOR PRESSURE, MM HG 96.00
 VAPOR DENSITY HEAVIER THAN AIR
 EVAPORATION RATE SLOWER THAN ETHER
 WEIGHT PER GALLON, LBS. 7.2
 % VOLATILE BY VOLUME 88.93
 % VOLATILE BY WEIGHT 84.87 N/A = NOT APPLICABLE N/E = NOT ESTABLISHED
 PH - SOLUBILITY- N/A

MANUFACTURER'S CODE: D0224 Revision : 01 DATE OF PREPARATION- 8/12/92

SECTION IV -- FIRE AND EXPLOSION HAZARD DATA

FLAMMABILITY CLASSIFICATION OSHA-CLASS IB DOT- FLAMMABLE LIQUID
LOWEST FLASHPOINT T.C.C., DEG. F 40.0 LOWER EXPLOSION LEVEL (LEL) 1.0

EXTINGUISHING MEDIA: ()-Foam (XXX)-Alcohol foam (XXX)-CO2
(XXX)-Dry chemical ()-Water fog ()-Other

SPECIAL FIRE FIGHTING PROCEDURES: Isolate from heat, sparks, electrical equipment and open flame. Water is not usually effective in fighting liquid fires.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Water spray may be used to cool closed containers to help prevent explosion when exposed to extreme heat.

SECTION V -- HEALTH HAZARD DATA

EFFECTS OF OVEREXPOSURE-(ACUTE): Irritating to eyes, skin, nose and throat. Headache, dizziness and nausea can result from inhalation. Repeated or prolonged skin contact may result in dryness possibly leading to dermatitis. TOXIC IF INGESTED. NOTE: If methanol is listed in section II-may be fatal or cause blindness if swallowed; cannot be made non-poisonous. If product contains toluene or xylene-may affect liver, kidneys or blood.

EFFECTS OF OVEREXPOSURE-(CHRONIC): Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents of this product may be harmful or fatal. MAY CONTAIN TOLUENE and/or XYLENE WHICH MAY HARM THE DEVELOPING FETUS IF A PREGNANT WOMAN IS EXPOSED. SEE SECTION II FOR INGREDIENT LISTING. DOES THIS PRODUCT CONTAIN ANY CHEMICALS CLASSIFIED AS KNOWN OR SUSPECTED CARCINOGENS (NTP/IARC/OSHA/ACGIH)? ()-YES (XXX)-NO
PRIMARY ROUTE(S) OF ENTRY: (XXX)-INHALATION (XXX)-DERMAL ()-INGESTION
EMERGENCY FIRST AID PROCEDURES: INHALATION-Remove to fresh air. Restore breathing. CONSULT PHYSICIAN. SPLASH(EYE)-Flush with water for at least 15 minutes. CONSULT PHYSICIAN. SPLASH(SKIN)-Wash with soap and water. Remove contaminated clothing. CONSULT PHYSICIAN IF IRRITATION PERSISTS. INGESTION-Drink 1 or 2 glasses of water to dilute. Do NOT induce vomiting. CONSULT PHYSICIAN OR POISON CONTROL CENTER IMMEDIATELY.

MEDICAL CONDITIONS PRONE TO AGGRAVATION BY EXPOSURE: Pre-existing skin disorders, chronic respiratory disease.

SECTION VI -- REACTIVITY DATA

STABILITY: (XXX)-STABLE ()-UNSTABLE

CONDITIONS TO AVOID: None reasonably foreseeable.

INCOMPATIBILITY (MATERIALS TO AVOID): If product contains aluminum-do not contaminate with acids, caustics, chlorinated hydrocarbons or oxidizers as these materials will react with aluminum to produce hydrogen and heat. See Section II (Hazardous Ingredients) to see if product contains aluminum.

HAZARDOUS POLYMERIZATION: ()-WILL OCCUR (XXX)-WILL NOT OCCUR

CONDITIONS TO AVOID: None reasonably foreseeable (see materials to avoid).

HAZARDOUS DECOMPOSITION PRODUCTS: Mostly CO2 with some CO.

MANUFACTURER'S CODE: D0224

Revision : 01

DATE OF PREPARATION- 8/12/92

SECTION VII -- SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Remove all spark sources, flames and hot surfaces. Maintain adequate ventilation. Avoid breathing vapors. Add absorbent to spill area. Recover free liquid. Keep chemical products out of streams and waterways.

WASTE DISPOSAL METHOD: Dispose of in accordance with local, state, and federal regulations.

SECTION VIII -- SAFE HANDLING & USE INFORMATION

RESPIRATORY PROTECTION: Unless air monitoring demonstrates vapor/dust/mist levels below the current PEL or TLV values always wear an appropriate, properly fitted (NIOSH/MSHA approved) respirator during use.

EYE PROTECTION: Chemical safety goggles (or glasses with side shields) or face shields to prevent eye splashes.

VENTILATION: Should be explosion proof and keep the air contaminant concentration below current OSHA Permissible Exposure Limit (PEL) or ACGIH's Threshold Limit Value (TLV).

PROTECTIVE GLOVES: Required to prevent skin contact.

OTHER PROTECTIVE EQUIPMENT: Remove and wash contaminated clothing before re-use.

HYGIENIC PRACTICES: Wash thoroughly before eating, smoking or using toilet facilities.

SECTION IX-- SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Avoid storage in high temperature areas or near fire or open flame. Keep container closed. Use only with adequate ventilation.

OTHER PRECAUTIONS: Avoid contact with eyes and prolonged or repeated contact with skin. DO NOT INGEST. FOR INDUSTRIAL USE ONLY.

THE ABOVE INFORMATION HAS BEEN DERIVED FROM INFORMATION PROVIDED BY OUR RAW MATERIAL SUPPLIERS AND TO OUR BEST BELIEF AND KNOWLEDGE IS FACTUAL.

THESE DATA RELATE ONLY TO THE SPECIFIC MATERIAL DESIGNATED HEREIN AND DO NOT RELATE TO USE IN COMBINATION WITH ANY OTHER MATERIAL.

MSDS-A1 Text Revised 12/89.

Prepared by: L. Dussault

MORTON COATINGS INC.
HAYNES CIRCLE
CHICOPEE MA. 01002-3794

RECEIVED
AUG 18 1992

*
* MATERIAL SAFETY DATA SHEET *
*

AMERICAN ENGINEERING COMP
265 3RD STREET

CAMBRIDGE MA 02142-0000

ATTENTION: Safety Director

DEAR CUSTOMER,

ENCLOSED PLEASE FIND UPDATED MSDS IN ACCORDANCE WITH THE OSHA
HAZARD COMMUNICATION STANDARD (29CFR1910.1200) FOR A PRODUCT
YOU RECENTLY ORDERED. IF YOU REQUIRE ANY ADDITIONAL MSDS
PLEASE REQUEST BY ENTERING THE PRODUCT ID IN THE SPACES PROVIDED
BELOW. FOLD REQUEST WITH RETURN ADDRESS FACING OUTWARD.

REQUEST FOR ADDITIONAL MSDS

LIST PRODUCT NUMBERS

1. _____ 2. _____

THIS PRODUCT CONTAINS A TOXIC CHEMICAL OR CHEMICALS SUBJECT TO THE REPORTING
REQUIREMENTS OF SECTION 313 OF SARA TITLE III AND OF 40CFR372 IF 'YES' IS PRINT-
ED IN THE COLUMN LABELED SARA 313 IN SECTION II OF THE MSDS.

(STAPLE)

PLACE
POSTAGE
HERE

AMERICAN ENGINEERING COMP
265 3RD STREET

CAMBRIDGE MA
02142-0000

MORTON COATINGS INC.
HAYNES CIRCLE
CHICOPEE MA 01020-3794

ATTN: LAURIE DUSSAULT

0908-1908

TRW-00542



Man-GILL CHEMICAL COMPANY

23000 ST. CLAIR AVE. • CLEVELAND, OHIO 44117 • 800-328-9745
EMERGENCY 24 HOUR CHEMTREC NO. 800-424-9300

MATERIAL SAFETY DATA SHEET

Tom
Revised General
Revised 10/31/88

07877

Section I

Identity CLEAR TINT BASE ENAMEL	Date Printed 10/04/88 NFPA CODE: HEALTH: 3	Date Revised 02/02/88 FLAMMABILITY: 3 REACTIVITY: 1
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Section II - Hazardous Ingredients

Hazardous Ingredients	CAS #	Health Hazards	ACGIH TLV-TWA
BUTYL CELLOSOLVE (2-BUTOXYETHANOL)	111-76-2	COMBUSTIBLE STEL - 75 PPM	25 PPM SKIN
FORMALDEHYDE *IARC MONOGRAPHS - POTENTIAL	50-00-0	*SUSPECT CANCER HUMAN CARCINOGEN	1.5 MG/CUM STEL - 2PPM
BUTYL ALCOHOL (BUTANOL)	71-36-3	FLAMMABLE	50 PPM C (SKIN)
METHYL AMYL KETONE NIOSH - 100 PPM	110-43-0	COMBUSTIBLE	50 PPM
N PROPYL ALCOHOL (N PROPANOL)	71-23-8	FLAMMABLE	200 PPM (SKIN)
XYLENE NIOSH - 100 PPM	1330-20-7	FLAMMABLE	435 MG/CUM
ETHYLBENZENE NIOSH - 100 PPM	100-41-4	STEL - 125 PPM	100 PPM
EPOXY RESIN SOLIDS		NOISANCE DUST	10 MG/CUM

Section III - Physical/Chemical Characteristics

Boiling Point 180-340 DEG F	Specific Gravity(H ₂ O=1) .95
Vapor Pressure(mm Hg) NOT DETERMINED	Percent Volatile By Volume (%) 75
Vapor Density (AIR=Reference) HEAVIER	Evaporation Rate (Ether=Reference) SLOWER
Water Soluble NO	
Appearance and Odor CLEAR LIQUID, MILD ODOR	

Section IV - Fire and Explosion Hazard Data

Flash Point (Method Used) 53 DEG F 100	Flammable Limits LOWEST VALUE	LEL 1.0	UEL
Extinguishing Media	CARBON DIOXIDE, DRY CHEMICAL		
Special Fire Fighting Procedures BUILD UP IN CONTAINER.	IF EXPOSED TO HEAT, PRESSURE WILL		

TRW-00543

0908-1909

METAL PROCESSING SY.



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MATERIAL SAFETY DATA SHEET

CLEAR TINT BASE ENAMEL

07877

Section IV - Fire and Explosion Hazard Data Cont.

Unusual Fire and Explosion Hazards A STRAIGHT WATER STREAM WOULD SPREAD FIRES. STATIC ELECTRICITY COULD CAUSE IGNITION.

Section V - Reactivity Data

STABILITY	Unstable	Conditions to Avoid
	Stable *	AVOID PROLONGED STORAGE AT ELEVATED TEMPERATURES.

INCOMPATIBILITY (Materials to Avoid)
STRONG OXIDIZERS, ALKALIS

Hazardous Decomposition Products
OXIDES OF CARBON, ORGANIC COMPOUNDS, ACID FUMES, ALDEHYDES, OTHER ORGANICS

HAZARDOUS	May Occur	Conditions to Avoid
POLYMERIZATION	Will Not Occur *	NONE

Section VI - Health Hazard Data

Effects of Overexposure IRRITATING TO EYES, NOSE & THROAT. INHALATION MAY CAUSE DIZZINESS, EXCITEMENT, DROWSINESS & STAGGERING GAIT. INGESTION MAY CAUSE NAUSEA, VOMITING & ABDOMINAL PAIN. EXPOSURE TO HIGH LEVELS OF VAPOR MAY CAUSE REVERSIBLE DAMAGE TO KIDNEYS & LIVER, SKIN RASH & REVERSIBLE EYE DAMAGE. MAY CAUSE HEMOLYSIS & HEMOGLOBINURIA. TARGET ORGANS AFFECTED - CNS, EYES, GI TRACT, BLOOD, LIVER, KIDNEYS & SKIN.

Emergency and First Aid Procedures

Eye (Contact): FLUSH EYES WITH COPIOUS AMOUNTS OF WATER FOR 15 MINUTES AND CONTACT PHYSICIAN IMMEDIATELY.

Skin (Contact): WASH WITH SOAP AND WATER. CONTACT PHYSICIAN IF IRRITATION PERSISTS.

Ingestion (Swallowing): DO NOT INDUCE VOMITING. DRINK LARGE QUANTITIES OF WATER AND/OR MILK. CONSULT PHYSICIAN IMMEDIATELY.

Inhalation (Breathing): REMOVE TO FRESH AIR. AID IN BREATHING IF NECESSARY AND GET IMMEDIATE MEDICAL ATTENTION IF NEEDED.

Section VII - Precautions for Safe Handling & Use

Steps to be taken in Case Material is Released or Spilled

WEAR APPROPRIATE PROTECTIVE EQUIPMENT. REMOVE IGNITION SOURCES. CONTAIN SPILL. ABSORB WITH INERT MATERIAL AND DISPOSE.

Waste Disposal Method: DISPOSE IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS.

0908-1910

TRW-00544

METAL PROCESSING SYSTEMS



Man-GILL CHEMICAL COMPANY

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MATERIAL SAFETY DATA SHEET

CLEAR TINT BASE ENAMEL

07877

Section VII - Precautions for Safe Handling & Use Cont.

Handling and Storage

DO NOT STORE OR USE NEAR HEAT, SPARKS, OR FLAME. DO NOT STORE NEAR COMBUSTIBLE MATERIAL. DO NOT STORE IN DIRECT SUNLIGHT. WHEN SANDING DRY FILM, USE NIOSH APPROVED DUST MASK. KEEP CONTAINER TIGHTLY CLOSED WHEN NOT IN USE.

Other Precautions

SHOWERS AND EYE WASH FOUNTAINS SHOULD BE MADE AVAILABLE WHERE CHEMICALS ARE USED.

Section VIII - Control Measures

Respiratory Protection (Specify Type)

USE NIOSH APPROVED EQUIPMENT WHEN AIRBORNE EXPOSURE LIMITS ARE EXCEEDED.

VENTILATION

Local
Mechanical

RECOMMENDED TO MAINTAIN BELOW TLV

Protective Gloves

NEOPRENE RUBBER

Eye Protection

SPLASH GOGGLES OR FACE SHIELD

Other Protective Clothing or Equipment

PROTECTIVE CLOTHING SUFFICIENT TO PREVENT SKIN CONTACT.

Work/Hygienic Practices

WASH THOROUGHLY BEFORE EATING, SMOKING OR USING TOILET FACILITIES.

0908-1911

TRW-00545

THE INFORMATION PRESENTED HEREIN HAS BEEN COMPILED FROM SOURCES CONSIDERED TO BE DEPENDABLE AND IS ACCURATE TO THE BEST OF THE SELLER'S KNOWLEDGE, HOWEVER, THE SELLER MAKES NO WARRANTY WHATSOEVER, EXPRESSED, IMPLIED, OR OF MERCHANTABILITY REGARDING THE ACCURACY OF SUCH DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF, THE SELLER ASSUMES NO RESPONSIBILITY FOR INJURY TO THE BUYER OR TO THE THIRD PARTY PERSONS OR FOR ANY DAMAGE TO ANY PROPERTY AND BUYER ASSUMES ALL SUCH RISK.

METAL PROCESSING SYSTEMS

Man-GILL CHEMICAL COMPANY

23000 ST. CLAIR AVE. • CLEVELAND, OHIO 44117 • 216 - 486-5300 • CHEMTREC 800 - 424-9300



MATERIAL SAFETY DATA SHEET

Section I				08221	
Identity		Date Prepared	12/16/86	Date Revised	01/02/86
CLEAR W.R. AIR DRY		NFPA CODE HEALTH	2	FLAMMABILITY	1
				REACTIVITY	1
Section II — Hazardous Ingredients					
Hazardous Ingredients	CAS #	Health Hazards	ACGIH TLV - TWA		
BUTYL CELLOSOLVE (2-BUTOXYETHANOL)	111-76-2	SKIN	120 MG/CUM		
AMMONIA	7664-90-5		18 MG/CUM		
NO COMPONENT WAS FOUND TO BE CARCINOGENIC IN NTP, IARC OR OSHA					
Section III — Physical/Chemical Characteristics					
Boiling Point		Specific Gravity (H ₂ O = 1)			
340-477 DEG F		1.01			
Vapor Pressure (mm Hg)		Percent Volatile By Volume (%)			
NOT DETERMINED		78			
Vapor Density (AIR = Reference)		Evaporation Rate (Ether = Reference)			
HEAVIER		SLOWER			
Water Soluble					
YES					
Appearance and Odor					
CLEAR LIQUID, MILD ODOR					
Section IV — Fire and Explosion Hazard Data					
Flash Point (Method Used)			Flammable Limits		LEL UEL
ABOVE 200 DEG F TCC			NOT APPLICABLE		
Extinguishing Media					
CARBON DIOXIDE. DRY CHEMICAL.					
Special Fire Fighting Procedures					
IF EXPOSED TO HEAT, PRESSURE WILL BUILD UP IN CONTAINER.					
Unusual Fire and Explosion Hazards					
A STRAIGHT WATER STREAM WOULD SPREAD FIRES. STATIC ELECTRICITY COULD CAUSE IGNITION.					

TRW-00546

Man-GILL CHEMICAL COMPANY

MATERIAL SAFETY DATA SHEET

CLEAR W.R. AIR DRY

08221

Section V — Reactivity Data

STABILITY	Unstable Stable *	Conditions to Avoid
AVOID PROLONGED STORAGE AT ELEVATED TEMPERATURES		
INCOMPATIBILITY (Materials to Avoid)		
STRONG OXIDIZERS, ALKALINE MATERIALS		
Hazardous Decomposition Products		
OXIDES OF CARBON, VARIOUS HYDROCARBONS		
HAZARDOUS POLYMERIZATION	May Occur Will Not Occur *	Conditions to Avoid NONE

Section VI — Health Hazard Data

Effects of Overexposure	MILD SKIN IRRITANT. HARMFUL IF SWALLOWED. IRRITATING TO THE EYES. INHALATION MAY CAUSE HEADACHE, NAUSEA, AND DIZZINESS.
Emergency and First Aid Procedures	
Eye (Contact):	FLUSH EYES WITH COPIOUS AMOUNTS OF WATER FOR 15 MINUTES AND CONTACT PHYSICIAN IMMEDIATELY.
Skin (Contact):	WASH WITH SOAP AND WATER. CONTACT PHYSICIAN IF IRRITATION PERSISTS.
Ingestion (Swallowing):	DO NOT INDUCE VOMITING. DRINK LARGE QUANTITIES OF WATER AND/OR MILK. CONSULT PHYSICIAN IMMEDIATELY.
Inhalation (Breathing):	REMOVE TO FRESH AIR.

Section VII — Precautions for Safe Handling & Use

Steps to be taken in Case Material is Released or Spilled	CONTAIN SPILL. ABSORB AND DISPOSE WASTE.
Waste Disposal Method:	DISPOSE IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS.
Precautions To be Taken in Handling and Storage	DO NOT STORE OR USE NEAR HEAT, SPARKS, OR FLAME. DO NOT STORE NEAR COMBUSTIBLE MATERIAL. DO NOT STORE IN DIRECT SUNLIGHT. WHEN SANDING DRY FILM, USE NIOSH APPROVED DUST MASK. KEEP CONTAINER TIGHTLY CLOSED WHEN NOT IN USE.
Other Precautions:	SHOWERS AND EYE WASH FOUNTAINS SHOULD BE MADE AVAILABLE WHERE CHEMICALS ARE USED.

Section VIII — Control Measures

Respiratory Protection (Specify Type)	USE NIOSH APPROVED EQUIPMENT WHEN AIRBORNE EXPOSURE LIMITS ARE EXCEEDED.
Ventilation	Local Mechanical RECOMMENDED TO MAINTAIN BELOW TLV
Protective Gloves	NEOPRENE RUBBER
Eye Protection	SPLASH GOGGLES OR FACE SHIELD
Other Protective Clothing or Equipment	PROTECTIVE CLOTHING SUFFICIENT TO PREVENT SKIN CONTACT.
Work/Hygienic Practices	WASH THOROUGHLY BEFORE EATING, SMOKING OR USING TOILET FACILITIES.
THE INFORMATION PRESENTED HEREIN HAS BEEN COMPILED FROM SOURCES CONSIDERED TO BE DEPENDABLE AND IS ACCURATE TO THE BEST OF SELLER'S KNOWLEDGE, HOWEVER, SELLER MAKES NO WARRANTY WHATSOEVER, EXPRESSED, IMPLIED OR OF MERCHANTABILITY REGARDING THE ACCURACY OF SUCH DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF, SELLER ASSUMES NO RESPONSIBILITY FOR INJURY TO BUYER OR TO THIRD PERSONS OR FOR ANY DAMAGE TO ANY PROPERTY AND BUYER ASSUMES ALL SUCH RISK.	

Man-GILL CHEMICAL COMPANY

23000 ST. CLAIR AVE. • CLEVELAND, OHIO 44117 • 216 - 486-5300 • CHEMTREC 800 - 424-9300



MATERIAL SAFETY DATA SHEET

Section I				07840
Identity	Date Prepared	12/16/86	Date Revised	12/06/85
CLEAR W/R FINISH	NFPA CODE HEALTH	2	FLAMMABILITY	1 REACTIVITY 1
Section II — Hazardous Ingredients				
Hazardous Ingredients	CAS #	Health Hazards	ACGIH TLV - TWA	
BUTYL CELLOSOLVE (2-BUTOXYETHANOL)	111-76-2	SKIN	120 MG/CUM	
AMMONIA	7664-90-5		18 MG/CUM	
NO COMPONENT WAS FOUND TO BE CARCINOGENIC IN NTP, IARC OR OSHA				
Section III — Physical/Chemical Characteristics				
Boiling Point	340 - 477 DEG F		Specific Gravity (H ₂ O = 1)	0.99
Vapor Pressure (mm Hg)	NOT DETERMINED		Percent Volatile By Volume (%)	78.5 +/- 1.0
Vapor Density (AIR = Reference)	HEAVIER		Evaporation Rate (Ether = Reference)	SLOWER
Water Soluble	YES			
Appearance and Odor	CLEAR LIQUID, MILD ODOR			
Section IV — Fire and Explosion Hazard Data				
Flash Point (Method Used)	ABOVE 200 DEG F		Flammable Limits	LEL UEL
Extinguishing Media	CARBON DIOXIDE. DRY CHEMICAL.		LOWEST VALVE	0.9
Special Fire Fighting Procedures	IF EXPOSED TO HEAT, PRESSURE WILL BUILD UP IN CONTAINER.			
Unusual Fire and Explosion Hazards	A STRAIGHT WATER STREAM WOULD SPREAD FIRES. STATIC ELECTRICITY COULD CAUSE IGNITION.			

TRW-00548

MAN-GILL CHEMICAL COMPANY

MATERIAL SAFETY DATA SHEET

CLEAR W/R FINISH

07840

Section V — Reactivity Data

STABILITY	Unstable Stable *	Conditions to Avoid
AVOID PROLONGED STORAGE AT ELEVATED TEMPERATURES		
INCOMPATIBILITY (Materials to Avoid)		
ALKALIES, STRONG OXIDIZERS		
Hazardous Decomposition Products		
CO, CO ₂ , HYDROCARBONS		
HAZARDOUS POLYMERIZATION	May Occur Will Not Occur *	Conditions to Avoid NONE

Section VI — Health Hazard Data

Effects of Overexposure	MILD SKIN IRRITANT. HARMFUL IF SWALLOWED. IRRITATING TO THE EYES. INHALATION MAY CAUSE HEADACHE, NAUSEA, AND DIZZINESS.
Emergency and First Aid Procedures	
Eye (Contact):	FLUSH EYES WITH COPIOUS AMOUNTS OF WATER FOR 15 MINUTES AND CONTACT PHYSICIAN IMMEDIATELY.
Skin (Contact):	WASH WITH SOAP AND WATER. CONTACT PHYSICIAN IF IRRITATION PERSISTS.
Ingestion (Swallowing):	DRINK LARGE QUANTITIES OF WATER AND/OR MILK. INDUCE VOMITING. CONSULT PHYSICIAN IMMEDIATELY.
Inhalation (Breathing):	REMOVE TO FRESH AIR.

Section VII — Precautions for Safe Handling & Use

Steps to be taken in Case Material is Released or Spilled	
CONTAIN SPILL. ABSORB AND DISPOSE WASTE.	
Waste Disposal Method:	DISPOSE IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS.
Precautions To be Taken in Handling and Storage	
DO NOT STORE OR USE NEAR HEAT, SPARKS, OR FLAME. DO NOT STORE NEAR COMBUSTIBLE MATERIAL. DO NOT STORE IN DIRECT SUNLIGHT. WHEN SANDING DRY FILM, USE NIOSH APPROVED DUST MASK. KEEP CONTAINER TIGHTLY CLOSED WHEN NOT IN USE.	
Other Precautions:	SHOWERS AND EYE WASH FOUNTAINS SHOULD BE MADE AVAILABLE WHERE CHEMICALS ARE USED.

Section VIII — Control Measures

Respiratory Protection (Specify Type)		
USE NIOSH APPROVED EQUIPMENT WHEN AIRBORNE EXPOSURE LIMITS ARE EXCEEDED.		
Ventilation	Local Mechanical	RECOMMENDED TO MAINTAIN BELOW TLV
Protective Gloves	NEOPRENE RUBBER	Eye Protection SPLASH GOGGLES OR FACE SHIELD
Other Protective Clothing or Equipment		
PROTECTIVE CLOTHING SUFFICIENT TO PREVENT SKIN CONTACT.		
Work/Hygienic Practices		
WASH THOROUGHLY BEFORE EATING, SMOKING OR USING TOILET FACILITIES.		
THE INFORMATION PRESENTED HEREIN HAS BEEN COMPILED FROM SOURCES CONSIDERED TO BE DEPENDABLE AND IS ACCURATE TO THE BEST OF SELLER'S KNOWLEDGE, HOWEVER, SELLER MAKES NO WARRANTY WHATSOEVER, EXPRESSED, IMPLIED OR OF MERCHANTABILITY REGARDING THE ACCURACY OF SUCH DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF, SELLER ASSUMES NO RESPONSIBILITY FOR INJURY TO BUYER OR TO THIRD PERSONS OR FOR ANY DAMAGE TO ANY PROPERTY AND BUYER ASSUMES ALL SUCH RISK.		

PAINT GROUP
214 Northfield Road
Cleveland, Ohio 44146
216 - 232-3800



December 17, 1986

RECEIVED
JAN 05 1987
D. F. BORSUK

Mr. Dick Norcross
TRW/CARR FASTENER DIVISION
195 Binney Street
Cambridge, MA 02142

Dear Mr. Norcross:

As requested by Walter Rish, you will find enclosed Product Data and Material Safety Data Sheets pertaining to Man-Gill products 07840, 08219, and 08221.

Should you have any further questions, please feel free to contact us.

Sincerely,

MAN-GILL CHEMICAL COMPANY

Mark T. Messerly
Mark T. Messerly
Chemist

MTM/ab

cc: Walter A. Rish

RECEIVED
JAN 06 1987
D. F. BORSUK

Dennis
Samples for testing in 217

Dick
1-5-87

TRW-00550

Man-GILL CHEMICAL COMPANY
23000 St. Clair Ave. • Cleveland, Ohio 44117 • 216/486-5300 • Telex: 810-421-8465

0908-1916

MATERIAL SAFETY DATA SHEET

717

SECTION 1 - IDENTIFICATION DATA

FREDERICK GUNN ~~CHEMICAL~~ COMPANY, INC.
538 Forest Street, Kearny, NJ 07032

Emergency Telephone Numbers:
8:00 AM - 5:00 PM EST
(201) 991-4174
24 Hrs: (313) 644-5626

CLEPO BLACK WAX

D.O.T. HAZARD CLASS	- Chemical NOS	Effective Date:
CHEMICAL FAMILY	- WATER WAX EMULSION	01-31-90
CHEMICAL NAME/SYNONYMS	- CLEPO BLACK WAX	
FORMULA	- Mixture	
MSDS REVIEWED BY	- Keith Frey, V.P. Quality & Regulatory Affairs	

SECTION 2 - PHYSICAL DATA

BOILING POINT (Deg F)	- >212 deg F
VAPOR PRESSURE (mm Hg)	- NA
VAPOR DENSITY (air=1)	- NA
SOLUBILITY IN WATER	- Complete
SPECIFIC GRAVITY (H2O=1)	- Apprx. .99
VOLATILE BY VOLUME	- NA
EVAPORATION RATE (H2O=1)	- >1

APPEARANCE & ODOR:
BLACK LIQUID WITH NO ODOR

SECTION 3 - FIRE AND EXPLOSION DATA

FLASH POINT - None

EXTINGUISHING MEDIA:
This product is not combustible.

SPECIAL FIRE FIGHTING PROCEDURES:
Protective clothing and self-contained breathing apparatus should be worn by firefighters in areas where product is stored. Water spray, foam, dry chemical, or carbon dioxide may be used in areas where product is stored.

UNUSUAL FIRE AND EXPLOSION HAZARDS:
None

NFPA HAZARD CLASSIFICATION:

Health	(Blue)	- 1
Flammability	(Red)	- 0
Reactivity	(Yellow)	- 0

DEGREE OF HAZARD

4=Extreme
3=High
2=Moderate
1=Slight
0=Insignificant

=====

SECTION 4 - REACTIVITY DATA

=====

ABILITY: Stable
CONDITIONS TO AVOID: NA

INCOMPATIBILITY:
NA

HAZARDOUS DECOMPOSITION PRODUCTS:
None expected

HAZARDOUS POLYMERIZATION: Will not occur
CONDITIONS TO AVOID: NA

=====

SECTION 5 - HAZARDOUS COMPONENTS

=====

PAINTS, PRESERVATIVES, AND SOLVENTS:

NA

ALLOYS AND METALLIC COATINGS:

NA

HAZARDOUS COMPONENTS
NONE

CAS NUMBER TLV PEL LD50 %

✓ = Mg/M3 - PEL = Mg/M3 - LD50 = oral, rat, Mg/Kg - NF = None Found

- The indicated material, if any, is listed as a carcinogen or potential carcinogen by one or more of the following: National Toxicology Program, I.A.R.C. Monographs, OSHA.

** - The indicated material, if any, does not have an established TLV, but does appear on one or more of the following states hazardous substance lists: Connecticut, Illinois, Michigan, Maine, Massachusetts, Minnesota, New Hampshire, New Jersey, New York, Oregon, Rhode Island, West Virginia, and Wisconsin, and is present in this product in amounts greater than 1%.

& - The indicated material, if any, is subject to the reporting requirements of SARA Title III, Section 313

=====

SECTION 6 - SPILL, LEAK, AND DISPOSAL PROCEDURES

=====

SPILL & LEAK PROCEDURES:

Liquids should be contained and adsorbed with a suitable adsorbent, or flushed to the waste treatment area. Flush area with plenty of water. Avoid all personal contact.

WASTE DISPOSAL METHODS:

Waste solution should not be discharged into sewers or streams. Solution should first be neutralized to a locally acceptable pH, and then well diluted with water. Depending on usage and locality, may also require precipitation and filtration of heavy metals. Otherwise, contact local

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SECTION 6 - SPILL, LEAK, AND DISPOSAL PROCEDURES continued

=====

waste disposal contractor.

=====

SECTION 7 - HEALTH HAZARD DATA

=====

ROUTES OF EXPOSURE

INHALATION: Inhaling mist or spray is irritating to the upper respiratory tract and depending on the severity of exposure, may cause tissue damage. May also cause a decrease in alertness.

SKIN CONTACT: This product is irritating to tissues contacted and may cause skin damage.

SKIN ABSORPTION: See SKIN CONTACT above.

EYE CONTACT: This product is irritating to eye tissues on contact. May cause permanent eye damage.

INGESTION: This product, if swallowed, will be irritating to the mouth, throat, and stomach.

EFFECTS OF OVEREXPOSURE

ACUTE: Irritating to all body tissues with which it comes in contact.

CHRONIC: Repeated or prolonged exposure may cause dermatitis.

EMERGENCY AND FIRST AID PROCEDURES

EYES: IMMEDIATELY flush eyes with large amounts of water for at least 15 minutes, holding lids apart to ensure flushing of the entire surface. Washing eyes within 1 minute is essential to achieve maximum effectiveness. Seek medical attention immediately.

SKIN: Immediately wash contaminated areas with plenty of water for 15 minutes. Remove contaminated clothing and footwear, and wash clothing before reuse. Discard any clothing that can not be decontaminated. Seek medical attention immediately.

INHALATION: Get person out of contaminated area to fresh air. If breathing has stopped, resuscitate and administer oxygen if readily available. Seek medical attention immediately.

INGESTION: NEVER give anything by mouth to an unconscious person. If swallowed, do not induce vomiting. Give large quantities of water. If vomiting occurs spontaneously, keep airway clear. Seek medical attention immediately.

TRW-00553

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SECTION 8 - SPECIAL HANDLING PROCEDURES

=====

RESPIRATORY: Respiration protection is not required under normal use.
Use NIOSH/MSHA approved respirator where mist or spray may be generated above the TLV limit.

VENTILATION: Use adequate local exhaust ventilation where mist or spray may be generated, to maintain level below the TLV limit.

GLOVES: Impervious gloves should be worn (ex. rubber or neoprene).

EYES: Chemical safety goggles and/or face shield.

OTHER: Chemically resistant shoes and apron. Safety showers and eyewash facilities should be accessible. All contaminated clothing should be washed with soap and water, and dried before reuse.

=====

SECTION 9 - SPECIAL PRECAUTIONS

=====

HANDLING AND STORAGE PRECAUTIONS::

Avoid contact with skin and eyes. Wash thoroughly after handling material.
Store in a cool, dry area, in a closed container when not being used.
DO NOT STORE with strong acids & oxidizers, chlorinated organic compounds.

OTHER PRECAUTIONS:

Keep container tightly closed when not in use. Wash thoroughly after handling. Containers, even those that have been emptied, will retain product residue and vapors. Always obey hazard warnings and handle empty containers as if they were full. Containers must not be used for any other purpose.

The information herein is based on technical data that is believed to be reliable. It is intended for use by persons having technical skill and at their own discretion and risk. Since conditions of use are outside our control, we make no warranties, expressed or implied, and assume no liability in connection with the use of this information.

U.S. DEPARTMENT OF LABOR
Occupational Safety & Health Administration
MATERIAL SAFETY DATA SHEET

SECTION I		
MANUFACTURER'S NAME Frederick Gumm Chemical Company Inc.	EMERGENCY TELEPHONE NO. 401-232-0606	
ADDRESS (Number, Street, City, State, and ZIP Code) 20 Industrial Drive Smithfield RI 02917		
CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS Clepo Copper Wetter D	
CHEMICAL FAMILY	FORMULA	

SECTION II: HAZARDOUS INGREDIENTS					
PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES					

SECTION III: PHYSICAL DATA			
BOILING POINT (°F.)	212	SPECIFIC GRAVITY (H ₂ O=1)	1.05
VAPOR PRESSURE (mm Hg.)	NA	PERCENT VOLATILE BY VOLUME (%)	100
VAPOR DENSITY (AIR=1)	NA	EVAPORATION RATE (1 = 1)	100
SOLUBILITY IN WATER	complete		
APPEARANCE AND ODOR Clear light brown liquid			

SECTION IV: FIRE AND EXPLOSION HAZARD DATA			
FLASH POINT (Method used) NA	FLAMMABLE LIMITS	LFL	UFL
EXTINGUISHING MEDIA NA			
SPECIAL FIRE FIGHTING PROCEDURES None			
UNUSUAL FIRE AND EXPLOSION HAZARDS None			

TRW-00555

The data in this Material Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process.

SECTION V HEALTH HAZARD DATA	
THRESHOLD LIMIT VALUE	
EFFECTS OF OVEREXPOSURE	Drying and chapping of skin
EMERGENCY AND FIRST AID PROCEDURES	
	Flush with water.

SECTION VI REACTIVITY DATA			
STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	
INCOMPATIBILITY (Materials to avoid)			
HAZARDOUS DECOMPOSITION PRODUCTS			
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	
Absorb on soda ash and discard	
WASTE DISPOSAL METHOD	
Treat as for plating solution.	

SECTION VIII SPECIAL PROTECTION INFORMATION		
RESPIRATORY PROTECTION (Specify type)		
VENTILATION	LOCAL EXHAUST	SPECIAL
	MECHANICAL (General)	OTHER
PROTECTIVE GLOVES	Rubber	EYE PROTECTION
		Goggles
OTHER PROTECTIVE EQUIPMENT		
Rubber aprons and boots		

SECTION IX SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING	
Keep from freezing.	
OTHER PRECAUTIONS	

712
Copper line

MATERIAL SAFETY DATA SHEET

SECTION 1 - IDENTIFICATION DATA

FREDERICK GUMM CHEMICAL COMPANY, INC.
538 Forest Street, Kearny, NJ 07032

CLEPO DRG-49

Emergency Telephone Numbers:
8:00 AM - 5:00 PM EST
(201) 991-4174
24 Hrs: (313) 644-5626

D.O.T. HAZARD CLASS - Chemical NOS
CHEMICAL FAMILY - Plating bath additive
CHEMICAL NAME/SYNONYMS - CLEPO DRG-49
FORMULA - Mixture
MSDS REVIEWED BY - Keith Frey, V.P. Quality & Regulatory Affairs

Effective Date:
2-13-87

SECTION 2 - PHYSICAL DATA

BOILING POINT (Deg F) - Over 212 deg F
VAPOR PRESSURE (mm Hg) - NA
VAPOR DENSITY (air=1) - NA
SOLUBILITY IN WATER - Complete
SPECIFIC GRAVITY (H2O=1) - 1.13
VOLATILE BY VOLUME - 85%
EVAPORATION RATE (H2O=1) - >1

APPEARANCE & ODOR:
Clear to tan liquid

SECTION 3 - FIRE AND EXPLOSION DATA

FLASH POINT - None

EXTINGUISHING MEDIA:

This product is not combustible.

SPECIAL FIRE FIGHTING PROCEDURES:

Protective clothing and self-contained breathing apparatus should be worn by firefighters in areas where product is stored. Water spray, foam, dry chemical, or carbon dioxide may be used in areas where product is stored.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

None

NFPA HAZARD CLASSIFICATION:

Health (Blue) - 1
Flammability (Red) - 0
Reactivity (Yellow) - 1

DEGREE OF HAZARD

4=Extreme
3=High
2=Moderate
1=Slight
0=Insignificant

TRW-00557

=====

SECTION 4 - REACTIVITY DATA

=====

STABILITY: Stable

CONDITIONS TO AVOID: NA

INCOMPATIBILITY:

Strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS:

None expected

HAZARDOUS POLYMERIZATION: Will not occur

CONDITIONS TO AVOID: NA

=====

SECTION 5 - HAZARDOUS COMPONENTS

=====

PAINTS, PRESERVATIVES, AND SOLVENTS:

NA

ALLOYS AND METALLIC COATINGS:

NA

HAZARDOUS COMPONENTS

CAS NUMBER

TLV

PEL

LD50

%

NONE

(= Mg/M3 - PEL = Mg/M3 - LD50 = oral, rat, Mg/Kg - NF = None Found

- The indicated material, if any, is listed as a carcinogen or potential carcinogen by one or more of the following: National Toxicology Program, I.A.R.C. Monographs, OSHA.

** - The indicated material, if any, does not have an established TLV, but does appear on one or more of the following states hazardous substance lists: Connecticut, Illinois, Michigan, Maine, Massachusetts, Minnesota, New Hampshire, New Jersey, New York, Oregon, Rhode Island, West Virginia, and Wisconsin, and is present in this product in amounts greater than 1%.

& - The indicated material, if any, is subject to the reporting requirements of SARA Title III, Section 313

=====

SECTION 6 - SPILL, LEAK, AND DISPOSAL PROCEDURES

=====

SPILL & LEAK PROCEDURES:

Liquids should be contained and adsorbed with a suitable adsorbent, or flushed to the waste treatment area. Flush area with plenty of water. Avoid all personal contact.

WASTE DISPOSAL METHODS:

(Waste solution should not be discharged into sewers or streams. Solution should first be neutralized to a locally acceptable pH, and then well diluted with water. Depending on usage and locality, may also require precipitation and filtration of heavy metals. Otherwise, contact local

=====

SECTION 6 - SPILL, LEAK, AND DISPOSAL PROCEDURES continued

=====

Waste disposal contractor.

=====

SECTION 7 - HEALTH HAZARD DATA

=====

ROUTES OF EXPOSURE

INHALATION: Inhaling mist or spray is irritating to the upper respiratory tract and depending on the severity of exposure, may cause tissue damage. May also cause a decrease in alertness.

SKIN CONTACT: This product is irritating to tissues contacted and may cause skin damage.

SKIN ABSORPTION: See SKIN CONTACT above.

EYE CONTACT: This product is irritating to eye tissues on contact. May cause permanent eye damage.

INGESTION: This product, if swallowed, will be irritating to the mouth, throat, and stomach.

EFFECTS OF OVEREXPOSURE

ACUTE: Irritating to all body tissues with which it comes in contact.

CHRONIC: Repeated or prolonged exposure may cause dermatitis.

EMERGENCY AND FIRST AID PROCEDURES

EYES: IMMEDIATELY flush eyes with large amounts of water for at least 15 minutes, holding lids apart to ensure flushing of the entire surface. Washing eyes within 1 minute is essential to achieve maximum effectiveness. Seek medical attention immediately.

SKIN: Immediately wash contaminated areas with plenty of water for 15 minutes. Remove contaminated clothing and footwear, and wash clothing before reuse. Discard any clothing that can not be decontaminated. Seek medical attention immediately.

INHALATION: Get person out of contaminated area to fresh air. If breathing has stopped, resuscitate and administer oxygen if readily available. Seek medical attention immediately.

INGESTION: NEVER give anything by mouth to an unconscious person. If swallowed, do not induce vomiting. Give large quantities of water. If vomiting occurs spontaneously, keep airway clear. Seek medical attention immediately.

TRW-00559

=====

SECTION 8 - SPECIAL HANDLING PROCEDURES

=====

RESPIRATORY: Respiration protection is not required under normal use.
Use NIOSH/MSHA approved respirator where mist or spray may be generated above the TLV limit.

VENTILATION: Use adequate local exhaust ventilation where mist or spray may be generated, to maintain level below the TLV limit.

GLOVES: Impervious gloves should be worn (ex. rubber or neoprene).

EYES: Chemical safety goggles and/or face shield.

OTHER: Chemically resistant shoes and apron. Safety showers and eyewash facilities should be accessible. All contaminated clothing should be washed with soap and water, and dried before reuse.

=====

SECTION 9 - SPECIAL PRECAUTIONS

=====

HANDLING AND STORAGE PRECAUTIONS::

Avoid contact with skin and eyes. Wash thoroughly after handling material.
Store in a cool, dry area, in a closed container when not being used.
DO NOT STORE with strong acids & oxidizers, chlorinated organic compounds.

OTHER PRECAUTIONS:

Keep container tightly closed when not in use. Wash thoroughly after handling. Containers, even those that have been emptied, will retain product residue and vapors. Always obey hazard warnings and handle empty containers as if they were full. Containers must not be used for any other purpose.

TRW-00560

The information herein is based on technical data that is believed to be reliable. It is intended for use by persons having technical skill and at their own discretion and risk. Since conditions of use are outside our control, we make no warranties, expressed or implied, and assume no liability in connection with the use of this information.

MATERIAL SAFETY DATA SHEET

SECTION 1 - IDENTIFICATION DATA

FREDERICK GUMM CHEMICAL COMPANY, INC.
538 Forest Street, Kearny, NJ 07032

CLEPO PLUS 5

Emergency Telephone Numbers:

8:00 AM - 5:00 PM EST

(201) 991-4174

24 Hrs: (313) 644-5626

D.O.T. HAZARD CLASS - Chemical Solid NOS
CHEMICAL FAMILY - Alkaline cleaner
CHEMICAL NAME/SYNONYMS - CLEPO PLUS 5
FORMULA - Mixture
MSDS REVIEWED BY - Keith Frey, V.P. Quality & Regulatory Affairs

Effective Date:

02-13-90

SECTION 2 - PHYSICAL DATA

BOILING POINT (Deg F) - NA
VAPOR PRESSURE (mm Hg) - NA
VAPOR DENSITY (air=1) - NA
SOLUBILITY IN WATER - Complete to 32 oz/gal
SPECIFIC GRAVITY (H2O=1) - NA
VOLATILE BY VOLUME - NA
EVAPORATION RATE (H2O=1) - NA

APPEARANCE & ODOR:

Off white powder

SECTION 3 - FIRE AND EXPLOSION DATA

FLASH POINT - None

EXTINGUISHING MEDIA:

This product is not combustible.

SPECIAL FIRE FIGHTING PROCEDURES:

Protective clothing and self-contained breathing apparatus should be worn by firefighters in areas where product is stored. Water spray, foam, dry chemical, or carbon dioxide may be used in areas where product is stored.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

None

NFPA HAZARD CLASSIFICATION:

Health (Blue) - 1
Flammability (Red) - 0
Reactivity (Yellow) - 1

DEGREE OF HAZARD

4=Extreme
3=High
2=Moderate
1=Slight
0=Insignificant

TRW-00561

=====

SECTION 4 - REACTIVITY DATA

=====

STABILITY: Stable

CONDITIONS TO AVOID: NA

INCOMPATIBILITY:

Strong acids

HAZARDOUS DECOMPOSITION PRODUCTS:

None

HAZARDOUS POLYMERIZATION: Will not occur

CONDITIONS TO AVOID: NA

=====

SECTION 5 - HAZARDOUS COMPONENTS

=====

PAINTS, PRESERVATIVES, AND SOLVENTS:

NA

ALLOYS AND METALLIC COATINGS:

NA

HAZARDOUS COMPONENTS	CAS NUMBER	TLV	PEL	LD50	%
Sodium Silicate	6834-92-0	C 2	2	600	16.0
Tetrasodium Pyrophosphate	7722-88-5	5	NF	4000	5.00
Sodium Dodecylbenzene Sulfonate	25155-30-0	NF	NF	650	1.25

TLV = Mg/M3 - PEL = Mg/M3 - LD50 = oral, rat, Mg/kg - NF = None Found

- The indicated material, if any, is listed as a carcinogen or potential carcinogen by one or more of the following: National Toxicology Program, I.A.R.C. Monographs, OSHA.

** - The indicated material, if any, does not have an established TLV, but does appear on one or more of the following states hazardous substance lists: Connecticut, Illinois, Michigan, Maine, Massachusetts, Minnesota, New Hampshire, New Jersey, New York, Oregon, Rhode Island, West Virginia, and Wisconsin, and is present in this product in amounts greater than 1%.

& - The indicated material, if any, is subject to the reporting requirements of SARA Title III, Section 313

=====

SECTION 6 - SPILL, LEAK, AND DISPOSAL PROCEDURES

=====

SPILL & LEAK PROCEDURES:

Spilled material may be shoveled up, and stored in closed containers for possible normal use or proper disposal. Flush area with plenty of water.

TRW-00562

=====

SECTION 6 - SPILL, LEAK, AND DISPOSAL PROCEDURES continued

=====

WASTE DISPOSAL METHODS:

Waste should not be discharged directly into sewers or streams.
Neutralize to a locally acceptable pH, depending on usage and locality.
May also require precipitation and filtration of heavy metals.

=====

SECTION 7 - HEALTH HAZARD DATA

=====

ROUTES OF EXPOSURE

INHALATION: Coughing, sneezing, or other symptoms of upper respiratory tract irritation may occur. Severe exposure may result in lung tissue damage.

SKIN CONTACT: Dry product can be a skin irritant. May cause severe burns if not washed immediately.

SKIN ABSORPTION: N/A

EYE CONTACT: Dry product can cause tissue destruction and permanent eye damage if not treated immediately.

INGESTION: Dry product burns mucous membranes of the mouth, throat, esophagus, and stomach.

EFFECTS OF OVEREXPOSURE

ACUTE: Burns the mucous membranes of the respiratory tract, mouth, throat, esophagus, and stomach. Burns to eye and skin and possible permanent corneal damage.

CHRONIC: The chronic local effect may consist of multiple areas of superficial destruction of the skin or of primary irritant dermatitis. Similarly, inhalation of spray or mists may result in varying degrees of irritation.

EMERGENCY AND FIRST AID PROCEDURES

EYES: IMMEDIATELY flush eyes with large amounts of water for at least 15 minutes holding lids apart to ensure flushing of the entire surface. Washing eyes within one minute is essential to achieve maximum effectiveness. Seek medical attention immediately.

SKIN: Wash with plenty of water for 15 minutes. Remove contaminated clothing and footwear, and wash clothing before reuse. Discard any piece of clothing or footwear that can not be decontaminated. Seek medical attention if symptoms are present.

INHALATION: Get person out of contaminated area to fresh air.

INGESTION: NEVER give anything by mouth to an unconscious person. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. If available, give several glasses of milk. If vomiting occurs spontaneously, keep airway clear. Seek medical attention immediately.

IRW-00564

Page: 4

Material Safety Data Sheet for CLIPPO PLUS 5

The information herein is based on technical data that is believed to be reliable. It is intended for use by persons having technical skill and at their own discretion and risk. Since conditions of use are outside our control, we make no warranties, expressed or implied, and assume no liability in connection with the use of this information.

OTHER PRECAUTIONS:
Keep container tightly closed when not in use. Wash thoroughly after handling. Containers, even those that have been emptied, will retain product residue and vapors. Always obey hazard warnings and handle empty containers as if they were full. Containers must not be used for any other purpose.

HANDLING AND STORAGE PRECAUTIONS:
1. Store in a cool, dry area in a closed container.
Avoid contact with the skin and eyes. Wash thoroughly after handling.
FOR POWDERS:

SECTION 9 - SPECIAL PRECAUTIONS

OTHER: Chemically resistant shoes and apron. Safety showers and eyewash facilities should be accessible. Wash contaminated clothing with soap and water, and dry before reuse.

EYES: Chemical safety goggles and/or face shield.

GLOVES: Impermeable gloves should be worn (ex. rubber or neoprene).

VENTILATION: Use adequate local exhaust ventilation where dust, mist, or spray may be generated to maintain level below TLV limit.

RESPIRATORY: Respiration protection is not required under normal use. Use NIOSH/MSHA approved respirator where dust, mist, or spray may be generated above TLV limit.

SECTION 8 - SPECIAL HANDLING PROCEDURES

MATERIAL SAFETY DATA SHEET

SECTION 1 - IDENTIFICATION DATA

FREDERICK GUMM CHEMICAL COMPANY, INC.
538 Forest Street, Kearny, NJ 07032

CLEPO 39-NN

Emergency Telephone Numbers:
CHEMTREC 800-424-9300 (24HR)
8:00 AM - 5:00 PM EST
201-991-4174 Information

D.O.T. HAZARD CLASS - Cleaner Liquid NOS
CHEMICAL FAMILY - Alkaline Rust Inhibitor
CHEMICAL NAME/SYNONYMS - CLEPO 39-NN
FORMULA - Mixture
MSDS REVIEWED BY - Keith Frey, V.P. Quality & Regulatory Affairs

Effective Date:
01-12-90

SECTION 2 - PHYSICAL DATA

BOILING POINT (Deg F) - Over 212 deg F
VAPOR PRESSURE (mm Hg) - NA
VAPOR DENSITY (air=1) - NA
SOLUBILITY IN WATER - Complete
SPECIFIC GRAVITY (H2O=1) - 1.04
VOLATILE BY VOLUME - 78%
EVAPORATION RATE (H2O=1) - <1

APPEARANCE & ODOR:
Clear to yellow liquid

Post-It™ brand fax transmittal memo 7671		# of pages > 4
To	LOIS	From
Co.	TRW CHEMICAL	Co.
Dept.	OCT 22 1992	Phone #
Fax #		Fax #

SECTION 3 - FIRE AND EXPLOSION DATA

FLASH POINT -- None

EXTINGUISHING MEDIA:

This product is not combustible. See SPECIAL FIRE FIGHTING PROCEDURES.

SPECIAL FIRE FIGHTING PROCEDURES:

Protective clothing and self-contained breathing apparatus should be worn by firefighters in areas where product is stored. Water spray, foam, dry chemical, or carbon dioxide may be used in areas where product is stored.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

None

NFPA HAZARD CLASSIFICATION:

Health (Blue) - 1
Flammability (Red) - 0
Reactivity (Yellow) - 1

DEGREE OF HAZARD

4=Extreme
3=High
2=Moderate
1=Slight
0=Insignificant

=====

SECTION 4 - REACTIVITY DATA

=====

STABILITY: Stable

CONDITIONS TO AVOID: NA

INCOMPATIBILITY:

Strong acids.

HAZARDOUS DECOMPOSITION PRODUCTS:

None expected.

HAZARDOUS POLYMERIZATION: Will not occur

CONDITIONS TO AVOID: NA

=====

SECTION 5 - HAZARDOUS COMPONENTS

=====

PAINTS, PRESERVATIVES, AND SOLVENTS:

NA

ALLOYS AND METALLIC COATINGS:

NA

HAZARDOUS COMPONENTS

Mono Ethanol Amine (Ethanolamine)

CAS NUMBER

141-43-5

TLV

3

PEL

NF

LD50

2100

%

3.96

TLV = Mg/M3 - PEL = Mg/M3 - LD50 = oral, rat, Mg/Kg - NF = None Found

- The indicated material, if any, is listed as a carcinogen or potential carcinogen by one or more of the following: National Toxicology Program, I.A.R.C. Monographs, OSHA.

** - The indicated material, if any, does not have an established TLV, but does appear on one or more of the following states hazardous substance lists: Connecticut, Illinois, Michigan, Maine, Massachusetts, Minnesota, New Hampshire, New Jersey, New York, Oregon, Rhode Island, West Virginia, and Wisconsin, and is present in this product in amounts greater than 1%.

& - The indicated material, if any, is subject to the reporting requirements of SARA Title III, Section 313

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SECTION 6 - SPILL, LEAK, AND DISPOSAL PROCEDURES

=====

SPILL & LEAK PROCEDURES:

Liquids should be contained and adsorbed with a suitable adsorbent, or flushed to the waste treatment area. Flush area with plenty of water. Avoid all personal contact.

TRW-00566

WASTE DISPOSAL METHODS:

Waste solution should not be discharged into sewers or streams. Solution should first be neutralized to a locally acceptable pH, and then well diluted with water. Depending on usage and locality, may also require precipitation and filtration of heavy metals. Otherwise, contact local

=====

SECTION 6 - SPILL, LEAK, AND DISPOSAL PROCEDURES continued

waste disposal contractor.

=====

SECTION 7 - HEALTH HAZARD DATA

=====

ROUTES OF EXPOSURE

INHALATION: Inhaling mist or spray is irritating to the upper respiratory tract and depending on the severity of exposure, may cause tissue damage.

SKIN CONTACT: This product is irritating to tissues contacted and may cause skin damage.

SKIN ABSORPTION: See SKIN CONTACT above.

EYE CONTACT: This product is irritating to eye tissues on contact. May cause permanent eye damage.

INGESTION: This product, if swallowed, will be irritating to the mouth, throat, and stomach.

EFFECTS OF OVEREXPOSURE

ACUTE: Irritating to all body tissues with which it comes in contact.

CHRONIC: Repeated or prolonged exposure may cause dermatitis.

EMERGENCY AND FIRST AID PROCEDURES

EYES: IMMEDIATELY flush eyes with large amounts of water for at least 15 minutes, holding lids apart to ensure flushing of the entire surface. Washing eyes within 1 minute is essential to achieve maximum effectiveness. Seek medical attention immediately.

SKIN: Immediately wash contaminated areas with plenty of water for 15 minutes. Remove contaminated clothing and footwear, and wash clothing before reuse. Discard any clothing that can not be decontaminated. Seek medical attention immediately.

INHALATION: Get person out of contaminated area to fresh air. If breathing has stopped, resuscitate and administer oxygen if readily available. Seek medical attention immediately.

INGESTION: NEVER give anything by mouth to an unconscious person. If swallowed, do not induce vomiting. Give large quantities of water. If vomiting occurs spontaneously, keep airway clear. Seek medical attention immediately.

TRW-00567

0908-1933

=====

SECTION 8 - SPECIAL HANDLING PROCEDURES

=====

RESPIRATORY: Respiration protection is not required under normal use.
Use NIOSH/MSHA approved respirator where mist or spray may be generated above the TLV limit.

VENTILATION: Use adequate local exhaust ventilation where mist or spray may be generated, to maintain level below the TLV limit.

GLOVES: Impervious gloves should be worn (ex. rubber or neoprene).

EYES: Chemical safety goggles and/or face shield.

OTHER: Chemically resistant shoes and apron. Safety showers and eyewash facilities should be accessible. All contaminated clothing should be washed with soap and water, and dried before reuse.

=====

SECTION 9 - SPECIAL PRECAUTIONS

=====

HANDLING AND STORAGE PRECAUTIONS::

Avoid contact with skin and eyes. Wash thoroughly after handling material.
Store in a cool, dry area, in a closed container when not being used.
DO NOT STORE with strong acids.

OTHER PRECAUTIONS:

Keep container tightly closed when not in use. Wash thoroughly after handling. Containers, even those that have been emptied, will retain product residue and vapors. Always obey hazard warnings and handle empty containers as if they were full. Containers must not be used for any other purpose.

TRW-00568

The information herein is based on technical data that is believed to be reliable. It is intended for use by persons having technical skill and at their own discretion and risk. Since conditions of use are outside our control, we make no warranties, expressed or implied, and assume no liability in connection with the use of this information.

SECTION V: HEALTH HAZARD DATA

LIMIT VALUE Powder 4.0 mg/M³ calculated

OF OVEREXPOSURE

AGENCY AND FIRST AID PROCEDURES

See attached sheet

SECTION VI: REACTIVITY DATA

ABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	

COMPATIBILITY (MATERIALS TO AVOID)

DANGEROUS DECOMPOSITION PRODUCTS

DANGEROUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR		

SECTION VII: SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Sweep up and/or flush away

WASTE DISPOSAL METHOD

Neutralize to acceptable pH and dump to drain. May be necessary
to settle or filter out heavy metal hydroxides from parts processed.

SECTION VIII: SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (SPECIFY TYPE)

Dust respirator when handling powder.

VENTILATION	LOCAL EXHAUST Required	SPECIAL
	MECHANICAL (GENERAL)	OTHER

PROTECTIVE GLOVES	Rubber or neoprene	EYE PROTECTION	Goggles
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OTHER PROTECTIVE EQUIPMENT Depending on local conditions, rubber or neoprene apron and/or boots
may be indicated.

SECTION IX: SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

See attached sheet

OTHER PRECAUTIONS

See attached sheet

Prepared by: *L. J. Durney* L.J. Durney Tech. Director12/74
DATE

TRW-00570



FREDERICK GUMM CHEMICAL COMPANY, INC.

538 Forest Street, Kearny, NJ 07032 991-4142

HAZARD SHEET

CLEPO 60-G

CLEPO 60-G is an alkaline high-current density electrocleaner for steel. It consists of blended alkalis of a higher activity so that from a hazard consideration it should be considered similar to caustic soda. The use concentration is sufficiently high that the solutions also must be considered hazardous, although obviously not to the same degree as the dry powder. Since the solutions are used hot, heat burns are also possible. Avoid contact with skin or eyes.

FIRST AID - skin - flush thoroughly with water. Wash with boric acid or apply boric acid compresses if needed. May also be necessary to treat for heat burns.

- eyes - flush thoroughly with water. Wash with sterile boric acid. Get medical attention.

STORAGE - Keep dry. Do not store with strong acids.

CAUTION - While being dissolved in water, CLEPO 60-G releases considerable heat. Additions of the powder to operating solutions should be made slowly with vigorous agitation, and the solution should be cooled to not more than 160°F to avoid localized boiling and the possibility of eruption due to the heat released.

The information presented herein, while not guaranteed, was prepared by technically knowledgeable personnel, and to the best of our knowledge is true and accurate. It is not intended to be all-inclusive, and the manner and conditions of use and handling may involve other or additional considerations.

LJD:12/74

TRW-00571

0908-1937

~~377~~
711

MATERIAL SAFETY DATA SHEET

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SECTION 1 - IDENTIFICATION DATA

=====

FREDERICK GUMM CHEMICAL COMPANY, INC.
538 Forest Street, Kearny, NJ 07032

Emergency Telephone Numbers:
8:00 AM - 5:00 PM EST
(201) 991-4174
24 Hrs: (313) 644-5626

CLEPO 131-W

D.O.T. HAZARD CLASS - Chemical Solid NOS
CHEMICAL FAMILY - Alkaline cleaner
CHEMICAL NAME/SYNONYMS - CLEPO 131-W
FORMULA - Mixture
MSDS REVIEWED BY - Keith Frey, V.P. Quality & Regulatory Affairs

Effective Date:
4-7-86

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SECTION 2 - PHYSICAL DATA

=====

BOILING POINT (Deg F) - NA
VAPOR PRESSURE (mm Hg) - NA
VAPOR DENSITY (air=1) - NA
SOLUBILITY IN WATER - Complete to 32 oz/gal
SPECIFIC GRAVITY (H2O=1) - NA
VOLATILE BY VOLUME - NA
EVAPORATION RATE (H2O=1) - NA

APPEARANCE & ODOR:
white powder

=====

SECTION 3 - FIRE AND EXPLOSION DATA

=====

FLASH POINT - None

EXTINGUISHING MEDIA:
This product is not combustible.

SPECIAL FIRE FIGHTING PROCEDURES:
Protective clothing and self-contained breathing apparatus should be worn by firefighters in areas where product is stored. Water spray, foam, dry chemical, or carbon dioxide may be used in areas where product is stored.

UNUSUAL FIRE AND EXPLOSION HAZARDS:
None

NFPA HAZARD CLASSIFICATION:

Health (Blue) - 1
Flammability (Red) - 0
Reactivity (Yellow) - 1

DEGREE OF HAZARD

4=Extreme
3=High
2=Moderate
1=Slight
0=Insignificant

=====

SECTION 4 - REACTIVITY DATA

=====

STABILITY: Stable

CONDITIONS TO AVOID: NA

INCOMPATIBILITY:

Strong acids

HAZARDOUS DECOMPOSITION PRODUCTS:

None

HAZARDOUS POLYMERIZATION: Will not occur

CONDITIONS TO AVOID: NA

=====

SECTION 5 - HAZARDOUS COMPONENTS

=====

PAINTS, PRESERVATIVES, AND SOLVENTS:

NA

ALLOYS AND METALLIC COATINGS:

NA

HAZARDOUS COMPONENTS

Tetrasodium Pyrophosphate

Tri Sodium Phosphate

CAS NUMBER

7722-88-5

10101-89-0

TLV

5

NF

PEL

NF

NF

LD50

4000

7400

%

20.0

50.0

TLV = Mg/M3 - PEL = Mg/M3 - LD50 = oral, rat, Mg/Kg - NF = None Found

- The indicated material, if any, is listed as a carcinogen or potential carcinogen by one or more of the following: National Toxicology Program, I.A.R.C. Monographs, OSHA.

** - The indicated material, if any, does not have an established TLV, but does appear on one or more of the following states hazardous substance lists: Connecticut, Illinois, Michigan, Maine, Massachusetts, Minnesota, New Hampshire, New Jersey, New York, Oregon, Rhode Island, West Virginia, and Wisconsin, and is present in this product in amounts greater than 1%.

& - The indicated material, if any, is subject to the reporting requirements of SARA Title III, Section 313

=====

SECTION 6 - SPILL, LEAK, AND DISPOSAL PROCEDURES

=====

SPILL & LEAK PROCEDURES:

Spilled material may be shoveled up, and stored in closed containers for possible normal use or proper disposal. Flush area with plenty of water.

WASTE DISPOSAL METHODS:

Waste should not be discharged directly into sewers or streams.

Neutralize to a locally acceptable pH, depending on usage and locality.

May also require precipitation and filtration of heavy metals.

=====

SECTION 7 - HEALTH HAZARD DATA

=====

ROUTES OF EXPOSURE

INHALATION: Coughing, sneezing, or other symptoms of upper respiratory tract irritation may occur. Severe exposure may result in lung tissue damage.

SKIN CONTACT: Dry product can be a skin irritant. May cause severe burns if not washed immediately.

SKIN ABSORPTION: N/A

EYE CONTACT: Dry product can cause tissue destruction and permanent eye damage if not treated immediately.

INGESTION: Dry product burns mucous membranes of the mouth, throat, esophagus, and stomach.

EFFECTS OF OVEREXPOSURE

ACUTE: Burns the mucous membranes of the respiratory tract, mouth, throat, esophagus, and stomach. Burns to eye and skin and possible permanent corneal damage.

CHRONIC: The chronic local effect may consist of multiple areas of superficial destruction of the skin or of primary irritant dermatitis. Similarly, inhalation of spray or mists may result in varying degrees of irritation.

EMERGENCY AND FIRST AID PROCEDURES

EYES: IMMEDIATELY flush eyes with large amounts of water for at least 15 minutes holding lids apart to ensure flushing of the entire surface. Washing eyes within one minute is essential to achieve maximum effectiveness. Seek medical attention immediately.

SKIN: Wash with plenty of water for 15 minutes. Remove contaminated clothing and footwear, and wash clothing before reuse. Discard any piece of clothing or footwear that can not be decontaminated. Seek medical attention if symptoms are present.

INHALATION: Get person out of contaminated area to fresh air.

INGESTION: NEVER give anything by mouth to an unconscious person. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. If available, give several glasses of milk. If vomiting occurs spontaneously, keep airway clear. Seek medical attention immediately.

=====

SECTION 8 - SPECIAL HANDLING PROCEDURES

=====

RESPIRATORY: Respiration protection is not required under normal use. Use NIOSH/MSHA approved respirator where dust, mist, or spray may be generated above TLV limit.

=====

SECTION 8 - SPECIAL HANDLING PROCEDURES continued

=====

VENTILATION: Use adequate local exhaust ventilation where dust, mist, or spray may be generated to maintain level below TLV limit.

GLOVES: Impervious gloves should be worn (ex. rubber or neoprene).

EYES: Chemical safety goggles and/or face shield.

OTHER: Chemically resistant shoes and apron. Safety showers and eyewash facilities should be accessible. Wash contaminated clothing with soap and water, and dry before reuse.

=====

SECTION 9 - SPECIAL PRECAUTIONS

=====

HANDLING AND STORAGE PRECAUTIONS::

Avoid contact with the skin and eyes. Wash thoroughly after handling.

FOR POWDERS:

1. Store in a cool, dry area in a closed container.

OTHER PRECAUTIONS:

Keep container tightly closed when not in use. Wash thoroughly after handling. Containers, even those that have been emptied, will retain product residue and vapors. Always obey hazard warnings and handle empty containers as if they were full. Containers must not be used for any other purpose.

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MATERIAL SAFETY DATA SHEET

SECTION 1 - IDENTIFICATION DATA

FREDERICK GUMM CHEMICAL COMPANY, INC.
538 Forest Street, Kearny, NJ 07032

CLEPO 138-B

Emergency Telephone Numbers:

8:00 AM - 5:00 PM EST

(201) 991-1171

24 Hrs: (313) 644-5626

Effective Date:

01-25-90

D.O.T. HAZARD CLASS - Chemical Solid NOS
CHEMICAL FAMILY - Alkaline cleaner
CHEMICAL NAME/SYNONYMS - CLEPO 138-B
FORMULA - Mixture
MSDS REVIEWED BY - Keith Frey, V.P. Quality & Regulatory Affairs

SECTION 2 - PHYSICAL DATA

BOILING POINT (Deg F) - NA
VAPOR PRESSURE (mm Hg) - NA
VAPOR DENSITY (air=1) - NA
SOLUBILITY IN WATER - Complete to 32 oz/gal
SPECIFIC GRAVITY (H2O=1) - NA
VOLATILE BY VOLUME - NA
EVAPORATION RATE (H2O=1) - NA

APPEARANCE & ODOR:

Off white powder

SECTION 3 - FIRE AND EXPLOSION DATA

FLASH POINT - None

EXTINGUISHING MEDIA:

This product is not combustible.

SPECIAL FIRE FIGHTING PROCEDURES:

Protective clothing and self-contained breathing apparatus should be worn by firefighters in areas where product is stored. Water spray, foam, dry chemical, or carbon dioxide may be used in areas where product is stored.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

None

NFPA HAZARD CLASSIFICATION:

DEGREE OF HAZARD

Health (Blue) - 1
Flammability (Red) - 0
Reactivity (Yellow) - 1

4=Extreme
3=High
2=Moderate
1=Slight
0=Insignificant

=====

SECTION 4 - REACTIVITY DATA

=====

STABILITY: Stable

CONDITIONS TO AVOID: NA

INCOMPATIBILITY:

Strong acids

HAZARDOUS DECOMPOSITION PRODUCTS:

None

HAZARDOUS POLYMERIZATION: Will not occur

CONDITIONS TO AVOID: NA

=====

SECTION 5 - HAZARDOUS COMPONENTS

=====

PAINTS, PRESERVATIVES, AND SOLVENTS:

NA

ALLOYS AND METALLIC COATINGS:

NA

HAZARDOUS COMPONENTS	CAS NUMBER	TLV	PEL	LD50	%
Sodium Silicate	6834-92-0	C 2	2	800	50.0
Tetrasodium Pyrophosphate	7722-88-5	5	NP	1000	6.50
Tri Sodium Phosphate	10101-89-0	NP	NP	7400	8.00
Stoddard Solvent	8052-41-3	525	2950	NP	0.50

TLV = Mg/M3 - PEL = Mg/M3 - LD50 = oral, rat, Mg/Kg - NP = None Found

- The indicated material, if any, is listed as a carcinogen or potential carcinogen by one or more of the following: National Toxicology Program, I.A.R.C. Monographs, OSHA.

** - The indicated material, if any, does not have an established TLV, but does appear on one or more of the following states hazardous substance lists: Connecticut, Illinois, Michigan, Maine, Massachusetts, Minnesota, New Hampshire, New Jersey, New York, Oregon, Rhode Island, West Virginia, and Wisconsin, and is present in this product in amounts greater than 1%.

& - The indicated material, if any, is subject to the reporting requirements of SARA Title III, Section 313

=====

SECTION 6 - SPILL, LEAK, AND DISPOSAL PROCEDURES

=====

SPILL & LEAK PROCEDURES:

Spilled material may be shoveled up, and stored in closed containers for possible normal use or proper disposal. Flush area with plenty of water.

TRW-00577

=====

SECTION 6 - SPILL, LEAK, AND DISPOSAL PROCEDURES continued

=====

WASTE DISPOSAL METHODS:

Waste should not be discharged directly into sewers or streams.
Neutralize to a locally acceptable pH, depending on usage and locality.
May also require precipitation and filtration of heavy metals.

=====

SECTION 7 - HEALTH HAZARD DATA

=====

ROUTES OF EXPOSURE

INHALATION: Coughing, sneezing, or other symptoms of upper respiratory tract irritation may occur. Severe exposure may result in lung tissue damage.

SKIN CONTACT: Dry product can be a skin irritant. May cause severe burns if not washed immediately.

SKIN ABSORPTION: N/A

EYE CONTACT: Dry product can cause tissue destruction and permanent eye damage if not treated immediately.

INGESTION: Dry product burns mucous membranes of the mouth, throat, esophagus, and stomach.

EFFECTS OF OVEREXPOSURE

ACUTE: Burns the mucous membranes of the respiratory tract, mouth, throat, esophagus, and stomach. Burns to eye and skin and possible permanent corneal damage.

CHRONIC: The chronic local effect may consist of multiple areas of superficial destruction of the skin or of primary irritant dermatitis. Similarly, inhalation of spray or mists may result in varying degrees of irritation.

EMERGENCY AND FIRST AID PROCEDURES

EYES: IMMEDIATELY flush eyes with large amounts of water for at least 15 minutes holding lids apart to ensure flushing of the entire surface. Washing eyes within one minute is essential to achieve maximum effectiveness. Seek medical attention immediately.

SKIN: Wash with plenty of water for 15 minutes. Remove contaminated clothing and footwear, and wash clothing before reuse. Discard any piece of clothing or footwear that can not be decontaminated. Seek medical attention if symptoms are present.

INHALATION: Get person out of contaminated area to fresh air.

INGESTION: NEVER give anything by mouth to an unconscious person. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. If available, give several glasses of milk. If vomiting occurs spontaneously, keep airway clear. Seek medical attention immediately.

TRW-00578

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OTHER PRECAUTIONS:
Keep container tightly closed when not in use. Wash thoroughly after handling. Containers, even those that have been emptied, will retain product residue and vapors. Always obey hazard warnings and handle empty containers as if they were full. Containers must not be used for any other purpose.

HANDLING AND STORAGE PRECAUTIONS:
Avoid contact with the skin and eyes. Wash thoroughly after handling.
1. Store in a cool, dry area in a closed container.
FOR POWDERS:

SECTION 9 - SPECIAL PRECAUTIONS

OTHER: Chemically resistant shoes and apron. Safety showers and eyewash facilities should be accessible. Wash contaminated clothing with soap and water, and dry before reuse.

EYES: Chemical safety goggles and/or face shield.

GLOVES: Impervious gloves should be worn (ex. rubber or neoprene).

VENTILATION: Use adequate local exhaust ventilation where dust, mist, or spray may be generated to maintain level below TLV limit.

RESPIRATORY: Respiration protection is not required under normal use. Use NIOSH/MSHA approved respirator where dust, mist, or spray may be generated above TLV limit.

SECTION 8 - SPECIAL HANDLING PROCEDURES

MATERIAL SAFETY DATA SHEET

SECTION 1 - IDENTIFICATION DATA

FREDERICK GUMM CHEMICAL COMPANY, INC.
538 Forest Street, Kearny, NJ 07032

CLEPO 140-DX

Emergency Telephone Numbers:

8:00 AM - 5:00 PM EST

(201) 991-1171

24 Hrs: (313) 644-5626

D.O.T. HAZARD CLASS - CHEMICAL N.O.I.
CHEMICAL FAMILY - Mild oxidizing acid
CHEMICAL NAME/SYNONYMS - CLEPO 140-DX
FORMULA - Mixture
MSDS REVIEWED BY - Keith Frey, V.P. Quality & Regulatory Affairs

Effective Date:

01-25-90

SECTION 2 - PHYSICAL DATA

BOILING POINT (Deg F) - NA
VAPOR PRESSURE (mm Hg) - NA
VAPOR DENSITY (air=1) - NA
SOLUBILITY IN WATER - Complete to 32 oz/gal
SPECIFIC GRAVITY (H2O=1) - NA
VOLATILE BY VOLUME - NA
EVAPORATION RATE (H2O=1) - NA

APPEARANCE & ODOR:
Off-white granules

SECTION 3 - FIRE AND EXPLOSION DATA

FLASH POINT - None

EXTINGUISHING MEDIA:

This product is not combustible.

SPECIAL FIRE FIGHTING PROCEDURES:

Protective clothing and self-contained breathing apparatus should be worn by firefighters in areas where product is stored. Water spray, foam, dry chemical, or carbon dioxide may be used in areas where product is stored.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

None

NFPA HAZARD CLASSIFICATION:

Health (Blue) - 1
Flammability (Red) - 0
Reactivity (Yellow) - 1

DEGREE OF HAZARD

4=Extreme
3=High
2=Moderate
1=Slight
0=Insignificant

=====

SECTION 4 - REACTIVITY DATA

=====

STABILITY: Stable

CONDITIONS TO AVOID: NA

INCOMPATIBILITY:

Strong alkali

HAZARDOUS DECOMPOSITION PRODUCTS:

None expected

HAZARDOUS POLYMERIZATION: Will not occur

CONDITIONS TO AVOID: NA

=====

SECTION 5 - HAZARDOUS COMPONENTS

=====

PAINTS, PRESERVATIVES, AND SOLVENTS:

NA

ALLOYS AND METALLIC COATINGS:

NA

HAZARDOUS COMPONENTS

CAS NUMBER

TLV

PEL

LD50

%

NONE

TLV = Mg/M3 - PEL = Mg/M3 - LD50 = oral, rat, Mg/Kg - NF = None Found

- The indicated material, if any, is listed as a carcinogen or potential carcinogen by one or more of the following: National Toxicology Program, I.A.R.C. Monographs, OSHA.

** - The indicated material, if any, does not have an established TLV, but does appear on one or more of the following states hazardous substance lists: Connecticut, Illinois, Michigan, Maine, Massachusetts, Minnesota, New Hampshire, New Jersey, New York, Oregon, Rhode Island, West Virginia, and Wisconsin, and is present in this product in amounts greater than 1%.

& - The indicated material, if any, is subject to the reporting requirements of SARA Title III, Section 313

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SECTION 6 - SPILL, LEAK, AND DISPOSAL PROCEDURES

=====

SPILL & LEAK PROCEDURES:

Spilled material may be shoveled up, and stored in closed containers for possible normal use or proper disposal. Flush area with plenty of water.

WASTE DISPOSAL METHODS:

Waste should not be discharged directly into sewers or streams.
Neutralize to a locally acceptable pH, depending on usage and locality.
May also require precipitation and filtration of heavy metals.

TRW-00581

0908-1948

TRW-00582

VENTILATION: Use adequate local exhaust ventilation where dust, mist, or spray may be generated.

RESPIRATORY: Respiration protection is not required under normal use. Use NIOSH/MSHA approved respirator where dust, mist, or spray may be generated.

SECTION 8 - SPECIAL HANDLING PROCEDURES

INGESTION: NEVER give anything by mouth to an unconscious person. If vomiting occurs spontaneously, keep airway clear. Seek medical attention immediately.
INHALATION: Get person out of contaminated area to fresh air.

SKIN: Wash with plenty of water for 15 minutes. Remove contaminated clothing and footwear, and wash clothing before reuse. Discard any piece of clothing or footwear that can not be decontaminated. Seek medical attention if symptoms are present.
EYES: IMMEDIATELY flush eyes with large amounts of water for at least 15 minutes holding lids apart to ensure flushing of the entire surface. Washing eyes within one minute is essential to achieve maximum effectiveness. Seek medical attention immediately.

EMERGENCY AND FIRST AID PROCEDURES

CHRONIC: Data not available.
ACUTE: Irritates the mucous membranes of the respiratory tract, mouth, throat, esophagus, and stomach. Can also cause permanent eye injury.

EFFECTS OF OVEREXPOSURE

INGESTION: Dry product irritates mucous membranes of the mouth, throat, esophagus, and stomach.
EYE CONTACT: Dry product can cause tissue destruction and permanent eye damage if not treated immediately.

SKIN ABSORPTION: NA

SKIN CONTACT: Dry product can be a skin irritant.
INHALATION: Coughing, sneezing, or other symptoms of upper respiratory tract irritation may occur. Severe exposure may result in lung tissue damage.

ROUTES OF EXPOSURE

SECTION 7 - HEALTH HAZARD DATA

=====

SECTION 8 - SPECIAL HANDLING PROCEDURES continued

=====

GLOVES: Impervious gloves should be worn (ex. rubber or neoprene).

EYES: Chemical safety goggles and/or face shield.

OTHER: Chemically resistant shoes and apron. Safety showers and eyewash facilities should be accessible. Wash contaminated clothing with soap and water, and dry before reuse.

=====

SECTION 9 - SPECIAL PRECAUTIONS

=====

HANDLING AND STORAGE PRECAUTIONS::

Avoid contact with skin and eyes. Wash thoroughly after handling. Store in a cool, dry area in a closed container.

OTHER PRECAUTIONS:

Keep container tightly closed when not in use. Wash thoroughly after handling. Containers, even those that have been emptied, will retain product residue and vapors. Always obey hazard warnings and handle empty containers as if they were full. Containers must not be used for any other purpose.

TRW-00583

The information herein is based on technical data that is believed to be reliable. It is intended for use by persons having technical skill and at their own discretion and risk. Since conditions of use are outside our control, we make no warranties, expressed or implied, and assume no liability in connection with the use of this information.

MATERIAL SAFETY DATA SHEET

SECTION 1 - IDENTIFICATION DATA

FREDERICK GUMM CHEMICAL COMPANY, INC.
538 Forest Street, Kearny, NJ 07032

CLEPO 157-CF

Emergency Telephone Numbers:

8:00 AM - 5:00 PM EST

(201) 991-1171

24 Hrs: (313) 644-5626

D.O.T. HAZARD CLASS - Chemical NOS
CHEMICAL FAMILY - Burnishing compound
CHEMICAL NAME/SYNONYMS - CLEPO 157-CF
FORMULA - Mixture
MSDS REVIEWED BY - Keith Frey, V.P. Quality & Regulatory Affairs

Effective Date:

01-25-90

SECTION 2 - PHYSICAL DATA

BOILING POINT (Deg F) - NA
VAPOR PRESSURE (mm Hg) - NA
VAPOR DENSITY (air=1) - NA
SOLUBILITY IN WATER - Complete to 16 oz/gal
SPECIFIC GRAVITY (H2O=1) - NA
VOLATILE BY VOLUME - NA
EVAPORATION RATE (H2O=1) - NA

APPEARANCE & ODOR:

Off white powder

SECTION 3 - FIRE AND EXPLOSION DATA

FLASH POINT - None

EXTINGUISHING MEDIA:

NA

SPECIAL FIRE FIGHTING PROCEDURES:

Protective clothing and self-contained breathing apparatus should be worn by firefighters in areas where product is stored. Water spray, foam, dry chemical, or carbon dioxide may be used in areas where product is stored.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

None

NFPA HAZARD CLASSIFICATION:

Health (Blue) - 1
Flammability (Red) - 0
Reactivity (Yellow) - 1

DEGREE OF HAZARD

4=Extreme
3=High
2=Moderate
1=Slight
0=Insignificant

=====

SECTION 4 - REACTIVITY DATA

=====

STABILITY: Stable

CONDITIONS TO AVOID: NA

INCOMPATIBILITY:

Strong acids

HAZARDOUS DECOMPOSITION PRODUCTS:

None

HAZARDOUS POLYMERIZATION: Will not occur

CONDITIONS TO AVOID: NA

=====

SECTION 5 - HAZARDOUS COMPONENTS

=====

PAINTS, PRESERVATIVES, AND SOLVENTS:

NA

ALLOYS AND METALLIC COATINGS:

NA

HAZARDOUS COMPONENTS

CAS NUMBER

TLV

PEL

LD50

%

Starch

9005-84-9

10

NP

NP

10.4

Sodium Dodecylbenzene Sulfonate

25155-30-0

NP

NP

650

0.10

TLV = Mg/M3 - PEL = Mg/M3 - LD50 = oral, rat, Mg/Kg - NP = None Found

- The indicated material, if any, is listed as a carcinogen or potential carcinogen by one or more of the following: National Toxicology Program, I.A.R.C. Monographs, OSHA.

** - The indicated material, if any, does not have an established TLV, but does appear on one or more of the following states hazardous substance lists: Connecticut, Illinois, Michigan, Maine, Massachusetts, Minnesota, New Hampshire, New Jersey, New York, Oregon, Rhode Island, West Virginia, and Wisconsin, and is present in this product in amounts greater than 1%.

& - The indicated material, if any, is subject to the reporting requirements of SARA Title III, Section 313

=====

SECTION 6 - SPILL, LEAK, AND DISPOSAL PROCEDURES

=====

SPILL & LEAK PROCEDURES:

Spilled material may be shoveled up, and stored in closed containers for possible normal use or proper disposal. Flush area with plenty of water.

WASTE DISPOSAL METHODS:

Waste should not be discharged directly into sewers or streams.

Neutralize to a locally acceptable pH, depending on usage and locality.

May also require precipitation and filtration of heavy metals.

TRW-00585

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SECTION 7 - HEALTH HAZARD DATA

=====

ROUTES OF EXPOSURE

INHALATION: Coughing, sneezing, or other symptoms of upper respiratory tract irritation may occur. Severe exposure may result in lung tissue damage.

SKIN CONTACT: Dry product can be a skin irritant.

SKIN ABSORPTION: NA

EYE CONTACT: Dry product can cause tissue destruction and permanent eye damage if not treated immediately.

INGESTION: Dry product irritates mucous membranes of the mouth, throat, esophagus, and stomach.

EFFECTS OF OVEREXPOSURE

ACUTE: Irritates the mucous membranes of the respiratory tract, mouth, throat, esophagus, and stomach. Can also cause permanent eye injury.

CHRONIC: Data not available.

EMERGENCY AND FIRST AID PROCEDURES

EYES: IMMEDIATELY flush eyes with large amounts of water for at least 15 minutes holding lids apart to ensure flushing of the entire surface. Washing eyes within one minute is essential to achieve maximum effectiveness. Seek medical attention immediately.

SKIN: Wash with plenty of water for 15 minutes. Remove contaminated clothing and footwear, and wash clothing before reuse. Discard any piece of clothing or footwear that can not be decontaminated. Seek medical attention if symptoms are present.

INHALATION: Get person out of contaminated area to fresh air.

INGESTION: NEVER give anything by mouth to an unconscious person. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. If vomiting occurs spontaneously, keep airway clear. Seek medical attention immediately.

=====

SECTION 8 - SPECIAL HANDLING PROCEDURES

=====

RESPIRATORY: Respiration protection is not required under normal use. Use NIOSH/MSHA approved respirator where dust, mist, or spray may be generated.

VENTILATION: Use adequate local exhaust ventilation where dust, mist, or spray may be generated.

TRW-00586

=====

SECTION 8 - SPECIAL HANDLING PROCEDURES continued

=====

GLOVES: Impervious gloves should be worn (ex. rubber or neoprene).

EYES: Chemical safety goggles and/or face shield.

OTHER: Chemically resistant shoes and apron. Safety showers and eyewash facilities should be accessible. Wash contaminated clothing with soap and water, and dry before reuse.

=====

SECTION 9 - SPECIAL PRECAUTIONS

=====

HANDLING AND STORAGE PRECAUTIONS:

Avoid contact with skin and eyes. Wash thoroughly after handling. Store in a cool, dry area in a closed container.

OTHER PRECAUTIONS:

Keep container tightly closed when not in use. Wash thoroughly after handling. Containers, even those that have been emptied, will retain product residue and vapors. Always obey hazard warnings and handle empty containers as if they were full. Containers must not be used for any other purpose.

TRW-00587

The information herein is based on technical data that is believed to be reliable. It is intended for use by persons having technical skill and at their own discretion and risk. Since conditions of use are outside our control, we make no warranties, expressed or implied, and assume no liability in connection with the use of this information.

U.S. DEPARTMENT OF LABOR

Occupational Safety & Health Administration

MATERIAL SAFETY DATA SHEET

SECTION I	
MANUFACTURER'S NAME Frederick Gumm Chemical Company	EMERGENCY TELEPHONE NO. 401-232-0666
ADDRESS (Number, Street, City, State, and ZIP Code) 20 Industrial Drive Smithfield RI 02917	
CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS Cleco 188-W
CHEMICAL FAMILY	FORMULA

SECTION II - HAZARDOUS INGREDIENTS					
PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV (Units)

SECTION III - PHYSICAL DATA			
BOILING POINT (°F.)	NA	SPECIFIC GRAVITY IN $H_2O = 1$	NA
VAPOR PRESSURE (mm Hg.)	NA	PERCENT VOLATILE BY VOLUME (%)	
VAPOR DENSITY (AIR = 1)	NA	EVAPORATION RATE (= 1)	
SOLUBILITY IN WATER	complete		
APPEARANCE AND ODOR			

SECTION IV - FIRE AND EXPLOSION HAZARD DATA			
FLASH POINT (Method used)	NA	FLAMMABLE LIMITS	LFL
EXTINGUISHING MEDIA	water		
SPECIAL FIRE FIGHTING PROCEDURES May sustain fire if ignited. Flood with water.			
UNUSUAL FIRE AND EXPLOSION HAZARDS None			

TRW-00588

The data in this Material Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process.

SECTION V HEALTH HAZARD DATA	
THRESHOLD LIMIT VALUE	
EFFECTS OF OVEREXPOSURE	Causes whitening and mild burning of skin.
EMERGENCY AND FIRST AID PROCEDURES	Flush with water. Apply skin cream if needed.

SECTION VI REACTIVITY DATA			
STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	
INCOMPATIBILITY (Materials to avoid) Combustible and flammable materials			
HAZARDOUS DECOMPOSITION PRODUCTS			
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	
Absorb on soda ash and drum	
WASTE DISPOSAL METHOD Dispose via licensed chemical disposer. Material is an oxidizing agent.	

SECTION VIII SPECIAL PROTECTION INFORMATION			
RESPIRATORY PROTECTION (Specify type)			
VENTILATION	LOCAL EXHAUST		SPECIAL
	MECHANICAL (General)		OTHER
PROTECTIVE GLOVES	Rubber	EYE PROTECTION	Goggles
OTHER PROTECTIVE EQUIPMENT Rubber aprons and boots.			

SECTION IX SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING	
Keep dry. Store away from combustible and flammable materials.	
OTHER PRECAUTIONS	

0908-1955

TRW-00589

MATERIAL SAFETY DATA SHEET

SECTION 1 - IDENTIFICATION DATA

FREDERICK GUMM CHEMICAL COMPANY, INC.
538 Forest Street, Kearny, NJ 07032

CLEPO 198-JA

Emergency Telephone Numbers:

8:00 AM - 5:00 PM EST

(201) 991-4174

24 hrs: (313) 644-5626

D.O.T. HAZARD CLASS - Corrosive Solid NOS
CHEMICAL FAMILY - Acid salt
CHEMICAL NAME/SYNONYMS - CLEPO 198-JA
FORMULA - Mixture
MSDS REVIEWED BY - Keith Frey, V.P. Quality & Regulatory Affairs

Effective Date:

01-26-90

SECTION 2 - PHYSICAL DATA

BOILING POINT (Deg F) - NA
VAPOR PRESSURE (mm Hg) - NA
VAPOR DENSITY (air=1) - NA
SOLUBILITY IN WATER - Complete to 32 oz/gal
SPECIFIC GRAVITY (H2O=1) - NA
VOLATILE BY VOLUME - NA
EVAPORATION RATE (H2O=1) - NA

APPEARANCE & ODOR:

Off white granuals

SECTION 3 - FIRE AND EXPLOSION DATA

FLASH POINT - None

EXTINGUISHING MEDIA:

This product is not combustible.

SPECIAL FIRE FIGHTING PROCEDURES:

Protective clothing and self-contained breathing apparatus should be worn by firefighters in areas where product is stored. Water spray, foam, dry chemical, or carbon dioxide may be used in areas where product is stored.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

At temp >570 F, hazardous fumes of sulfur dioxide & trioxide, HF & ammonia are evolved. They must be eliminated by forced drafted ventilation.

NFPA HAZARD CLASSIFICATION:

Health (Blue) - 3
Flammability (Red) - 0
Reactivity (Yellow) - 1

DEGREE OF HAZARD

4=Extreme
3=High
2=Moderate
1=Slight
0=Insignificant

=====

SECTION 4 - REACTIVITY DATA

=====

STABILITY: Stable

CONDITIONS TO AVOID: NA

INCOMPATIBILITY:

Should not be mixed with strong alkalies.

HAZARDOUS DECOMPOSITION PRODUCTS:

None expected, except under extreme heat as mentioned above under UNUSUAL FIRE AND EXPLOSION HAZARDS.

HAZARDOUS POLYMERIZATION: Will not occur

CONDITIONS TO AVOID: NA

=====

SECTION 5 - HAZARDOUS COMPONENTS

=====

PAINTS, PRESERVATIVES, AND SOLVENTS:

NA

ALLOYS AND METALLIC COATINGS:

NA

HAZARDOUS COMPONENTS

	CAS NUMBER	TLV	PEL	LD50	%
Ammonium Bifluoride	1341-49-7	2.5	2.5	350	5.00
Proprietary (NJTSR#-010625-5034-P)	*****	NP	NP	NP	2.00
#-1,3-Diethylthiourea	105-55-5	NP	NP	316	0.10

TLV = Mg/M3 - PEL = Mg/M3 - LD50 = oral, rat, Mg/Kg - NP = None Found

- The indicated material, if any, is listed as a carcinogen or potential carcinogen by one or more of the following: National Toxicology Program, I.A.R.C. Monographs, OSHA.

** - The indicated material, if any, does not have an established TLV, but does appear on one or more of the following states hazardous substance lists: Connecticut, Illinois, Michigan, Maine, Massachusetts, Minnesota, New Hampshire, New Jersey, New York, Oregon, Rhode Island, West Virginia, and Wisconsin, and is present in this product in amounts greater than 1%.

& - The indicated material, if any, is subject to the reporting requirements of SARA Title III, Section 313

=====

SECTION 6 - SPILL, LEAK, AND DISPOSAL PROCEDURES

=====

SPILL & LEAK PROCEDURES:

Spilled material may be shoveled up, and stored in closed containers for possible normal use or proper disposal. Flush area with plenty of water. Mild alkali or lime solutions may be used to neutralize final traces immediately after flushing.

TRW-00591

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SECTION 6 - SPILL, LEAK, AND DISPOSAL PROCEDURES continued

=====

WASTE DISPOSAL METHODS:

Acid waste solutions should not be discharged into sewers or streams. Acid should first be neutralized with dilute alkali or lime (to precipitate fluoride) solutions to a locally acceptable pH, and then well diluted with water. Depending on usage and locality, may also require precipitation and filtration of heavy metals. Obey all Federal, State, and Local laws.

=====

SECTION 7 - HEALTH HAZARD DATA

=====

ROUTES OF EXPOSURE

INHALATION: Breathing dust, mist, spray, or fumes may cause irritation to the respiratory system. Gross over exposure may result in further toxic effects, including difficult breathing and coughing.

SKIN CONTACT: This product is destructive to tissues contacted and may produce severe burns.

SKIN ABSORPTION: See SKIN CONTACT above. Also, high concentrations of fluoride in the urine have been reported following skin contact.

EYE CONTACT: This product is destructive to eye tissues on contact. May cause severe burns that result in damage to the eyes and even blindness.

INGESTION: This product, if swallowed, will cause severe burns of the mouth and stomach, and may cause complete tissue perforation. Other symptoms include severe shock, convulsions, toxic nephritis, cardiac disturbances, and poisoning due to hypocalcemia (precipitation of body calcium).

EFFECTS OF OVEREXPOSURE

ACUTE: Corrosive to all body tissues with which it comes in contact. Possible fluoride poisoning if swallowed.

CHRONIC: Data not available.

EMERGENCY AND FIRST AID PROCEDURES

EYES: IMMEDIATELY flush eyes with large amounts of water for at least 15 minutes, holding lids apart to ensure flushing of the entire surface. Washing eyes within 1 minute is essential to achieve maximum effectiveness. Seek medical attention immediately.

SKIN: Immediately wash contaminated areas with plenty of water for 15 minutes. Remove contaminated clothing and footwear, and wash clothing before reuse. Discard any clothing that can not be decontaminated. Seek medical attention immediately.

INHALATION: Get person out of contaminated area to fresh air. If breathing has stopped, resuscitate and administer oxygen if readily available. Seek medical attention immediately.

TRW-00592

=====

SECTION 7 - HEALTH HAZARD DATA continued

=====

INGESTION: NEVER give anything by mouth to an unconscious person. DO NOT INDUCE VOMITING. Give large quantities of milk, or other calcium-containing (ex. milk of magnesia, 1% lime & water). If vomiting occurs spontaneously, keep airway clear. Seek medical attention immediately.

=====

SECTION 8 - SPECIAL HANDLING PROCEDURES

=====

RESPIRATORY: Respiration protection is not required under normal use. Use NIOSH/MSHA approved respirator where dust, mist, or spray may be generated above TLV limit.

VENTILATION: Use adequate local exhaust ventilation where dust, mist, or spray may be generated, to maintain level below TLV limit.

GLOVES: Impervious gloves should be worn (ex. rubber or neoprene).

EYES: Chemical safety goggles and/or face shield.

OTHER: Chemically resistant shoes and apron. Safety showers and eyewash facilities should be accessible. All contaminated clothing should be washed with soap and water, and dried before reuse.

=====

SECTION 9 - SPECIAL PRECAUTIONS

=====

HANDLING AND STORAGE PRECAUTIONS::

Avoid contact with strong alkali. Will etch glass over prolonged period of time. Powder dissolves in water to form an acidic solution. Store in a cool dry area, in a closed container. Avoid contact with skin and eyes.

OTHER PRECAUTIONS:

Keep container tightly closed when not in use. Wash thoroughly after handling. Containers, even those that have been emptied, will retain product residue and vapors. Always obey hazard warnings and handle empty containers as if they were full. Containers must not be used for any other purpose.

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U.S. DEPARTMENT OF LABOR
Occupational Safety & Health Administration
MATERIAL SAFETY DATA SHEET

SECTION I	
MANUFACTURER'S NAME Frederick Gum Chemical Company Inc.	EMERGENCY TELEPHONE NO. 401-232-0606
ADDRESS (Number, Street, City, State, and ZIP Code) 20 Industrial Drive Smithfield RI 02917	
CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS Clepo 204-B
CHEMICAL FAMILY	FORMULA

SECTION II HAZARDOUS INGREDIENTS					
PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV (Units)

SECTION III PHYSICAL DATA			
BOILING POINT (°F.)	NA	SPECIFIC GRAVITY (H ₂ O = 1)	
VAPOR PRESSURE (mm Hg.)	NA	PERCENT VOLATILE BY VOLUME (%)	
VAPOR DENSITY (AIR = 1)	NA	EVAPORATION RATE (____ = 1)	
SOLUBILITY IN WATER	Insoluble		
APPEARANCE AND ODOR Pale yellow powder			

SECTION IV FIRE AND EXPLOSION HAZARD DATA					
FLASH POINT (Method used)	None	FLAMMABLE LIMITS	<table border="1"> <tr> <td>Let</td> <td>Uet</td> </tr> </table>	Let	Uet
Let	Uet				
EXTINGUISHING MEDIA	Water				
SPECIAL FIRE FIGHTING PROCEDURES Mildly oxidizing organic nitro compound. Once ignited, fire could be self sustaining.					
UNUSUAL FIRE AND EXPLOSION HAZARDS Complete saturation with water is needed for extinction.					

0908-1960

TRW-00594

The data in this Material Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process.

SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

EFFECTS OF OVEREXPOSURE

EMERGENCY AND FIRST AID PROCEDURES

Flush with water.

SECTION VI REACTIVITY DATA

STABILITY

UNSTABLE

STABLE

CONDITIONS TO AVOID

X

INCOMPATIBILITY (Materials to avoid)

HAZARDOUS DECOMPOSITION PRODUCTS

In a fire nitrogen oxides may be released.

HAZARDOUS
POLYMERIZATION

MAY OCCUR

WILL NOT OCCUR

X

CONDITIONS TO AVOID

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Sweep up and drum. Do not discard with easily oxidizable materials such as sawdust or paper.

WASTE DISPOSAL METHOD See 204-N

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)

Dust respirator when handling powder.

VENTILATION

LOCAL EXHAUST

Advisable

SPECIAL

MECHANICAL (General)

OTHER

PROTECTIVE GLOVES

Rubber or Neoprene

EYE PROTECTION

Goggles

OTHER PROTECTIVE EQUIPMENT

Rubber aprons and boots

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Keep dry. Do not store with

strong reducers or flammables.

OTHER PRECAUTIONS

0908-1961

TRW-00595

MATERIAL SAFETY DATA SHEET

SECTION 1 - IDENTIFICATION DATA

FREDERICK GUMM CHEMICAL COMPANY, INC.
538 Forest Street, Kearny, NJ 07032

CLPPO 198-JA

Emergency Telephone Numbers:
8:00 AM - 5:00 PM EST
(201) 991-1171
24 hrs: (313) 644-5626

D.O.T. HAZARD CLASS - Corrosive Solid NOS
CHEMICAL FAMILY - Acid Salt
CHEMICAL NAME/SYNONYMS - CLPPO 198-JA
FORMULA - Mixture
MSDS REVIEWED BY - Keith Frey, V.P. Quality & Regulatory Affairs
Effective Date: 01-26-90

SECTION 2 - PHYSICAL DATA

BOILING POINT (Deg F) - NA
VAPOR PRESSURE (mm Hg) - NA
VAPOR DENSITY (air=1) - NA
SOLUBILITY IN WATER - Complete to 32 oz/gal
SPECIFIC GRAVITY (H2O=1) - NA
VOLATILE BY VOLUME - NA
EVAPORATION RATE (H2O=1) - NA

APPEARANCE & ODOR:
Off white granules

SECTION 3 - FIRE AND EXPLOSION DATA

FLASH POINT - None

EXTINGUISHING MEDIA:

This product is not combustible.

SPECIAL FIRE FIGHTING PROCEDURES:

Protective clothing and self-contained breathing apparatus should be worn by firefighters in areas where product is stored. Water spray, foam, dry chemical, or carbon dioxide may be used in areas where product is stored.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

At temp >570 W, hazardous fumes of sulfur dioxide & trioxide, H₂S & ammonia are evolved. They must be eliminated by forced drafted ventilation.

NEPA HAZARD CLASSIFICATION:

Health (Blue) - 3
Flammability (Red) - 0
Reactivity (Yellow) - 1

DEGREE OF HAZARD

4=Extreme
3=High
2=Moderate
1=Slight
0=insignificant

TRW-00596

SECTION 4 - REACTIVITY DATA

STABILITY: Stable
CONDITIONS TO AVOID: NA

INCOMPATIBILITY:
Should not be mixed with strong alkalis.

HAZARDOUS DECOMPOSITION PRODUCTS:

None expected, except under extreme heat as mentioned above under UNUSUAL FIRE AND EXPLOSION HAZARDS.

HAZARDOUS POLYMERIZATION: Will not occur
CONDITIONS TO AVOID: NA

SECTION 5 - HAZARDOUS COMPONENTS

PAINTS, PRESERVATIVES, AND SOLVENTS:

NA

ALLOYS AND METALLIC COATINGS:

NA

HAZARDOUS COMPONENTS

Ammonium Bifluoride
Proprietary (NJSR#-010625-5034-P)
#-1,3-Diethylthiourea

CAS NUMBER	TLV	PEL	LD50	%
1341-49-7	2.5	2.5	350	5.00
*****	NP	NP	NP	2.00
105-55-5	NP	NP	316	0.10

TLV = Mg/M3 - PEL = Mg/M3 - LD50 = oral, rat, Mg/Kg - NP = None Found

- The indicated material, if any, is listed as a carcinogen or potential carcinogen by one or more of the following: National Toxicology Program, I.A.R.C. Monographs, OSHA.

** - The indicated material, if any, does not have an established TLV, but does appear on one or more of the following states hazardous substance lists: Connecticut, Illinois, Michigan, Maine, Massachusetts, Minnesota, New Hampshire, New Jersey, New York, Oregon, Rhode Island, West Virginia, and Wisconsin, and is present in this product in amounts greater than 1%.

& - The indicated material, if any, is subject to the reporting requirements of SARA Title III, Section 313

SECTION 6 - SPILL, LEAK, AND DISPOSAL PROCEDURES

SPILL & LEAK PROCEDURES:

Spilled material may be shoveled up, and stored in closed containers for possible normal use or proper disposal. Flush area with plenty of water. Mild alkali or lime solutions may be used to neutralize final traces immediately after flushing.

=====

SECTION 6 - SPILL, LEAK, AND DISPOSAL PROCEDURES continued

=====

WASTE DISPOSAL METHODS:

Acid waste solutions should not be discharged into sewers or streams. Acid should first be neutralized with dilute alkali or lime (to precipitate fluoride) solutions to a locally acceptable pH, and then well diluted with water. Depending on usage and locality, may also require precipitation and filtration of heavy metals. Obey all Federal, State, and local laws.

=====

SECTION 7 - HEALTH HAZARD DATA

=====

ROUTES OF EXPOSURE

INHALATION: Breathing dust, mist, spray, or fumes may cause irritation to the respiratory system. Gross over exposure may result in further toxic effects, including difficult breathing and coughing.

SKIN CONTACT: This product is destructive to tissues contacted and may produce severe burns.

SKIN ABSORPTION: See SKIN CONTACT above. Also, high concentrations of fluoride in the urine have been reported following skin contact.

EYE CONTACT: This product is destructive to eye tissues on contact. May cause severe burns that result in damage to the eyes and even blindness.

INGESTION: This product, if swallowed, will cause severe burns of the mouth and stomach, and may cause complete tissue perforation. Other symptoms include severe shock, convulsions, toxic nephritis, cardiac disturbances, and poisoning due to hypocalcemia (precipitation of body calcium).

EFFECTS OF OVEREXPOSURE

ACUTE: Corrosive to all body tissues with which it comes in contact. Possible fluoride poisoning if swallowed.

CHRONIC: Data not available.

EMERGENCY AND FIRST AID PROCEDURES

EYES: IMMEDIATELY flush eyes with large amounts of water for at least 15 minutes, holding lids apart to ensure flushing of the entire surface. Washing eyes within 1 minute is essential to achieve maximum effectiveness. Seek medical attention immediately.

SKIN: Immediately wash contaminated areas with plenty of water for 15 minutes. Remove contaminated clothing and footwear, and wash clothing before reuse. Discard any clothing that can not be decontaminated. Seek medical attention immediately.

INHALATION: Get person out of contaminated area to fresh air. If breathing has stopped, resuscitate and administer oxygen if readily available. Seek medical attention immediately.

=====

SECTION 7 - HEALTH HAZARD DATA continued

=====

INGESTION: NEVER give anything by mouth to an unconscious person. DO NOT INDUCE VOMITING. Give large quantities of milk, or other calcium-containing (ex. milk of magnesia, 1% lime & water). If vomiting occurs spontaneously, keep airway clear. Seek medical attention immediately.

=====

SECTION 8 - SPECIAL HANDLING PROCEDURES

=====

RESPIRATORY: Respiration protection is not required under normal use. Use NIOSH/MSHA approved respirator where dust, mist, or spray may be generated above TLV limit.

VENTILATION: Use adequate local exhaust ventilation where dust, mist, or spray may be generated, to maintain level below TLV limit.

GLOVES: Impervious gloves should be worn (ex. rubber or neoprene).

EYES: Chemical safety goggles and/or face shield.

OTHER: Chemically resistant shoes and apron. Safety showers and eyewash facilities should be accessible. All contaminated clothing should be washed with soap and water, and dried before reuse.

=====

SECTION 9 - SPECIAL PRECAUTIONS

=====

HANDLING AND STORAGE PRECAUTIONS::

Avoid contact with strong alkali. Will etch glass over prolonged period of time. Powder dissolves in water to form an acidic solution. Store in a cool dry area, in a closed container. Avoid contact with skin and eyes.

OTHER PRECAUTIONS:

Keep container tightly closed when not in use. Wash thoroughly after handling. Containers, even those that have been emptied, will retain product residue and vapors. Always obey hazard warnings and handle empty containers as if they were full. Containers must not be used for any other purpose.

TRW-00599

The information herein is based on technical data that is believed to be reliable. It is intended for use by persons having technical skill and at their own discretion and risk. Since conditions of use are outside our control, we make no warranties, expressed or implied, and assume no liability in connection with the use of this information.

U.S. DEPARTMENT OF LABOR

Occupational Safety & Health Administration

MATERIAL SAFETY DATA SHEET

SECTION I	
MANUFACTURER'S NAME Frederick Gunn Chemical Company Inc.	EMERGENCY TELEPHONE NO. 401-232-0606
ADDRESS (Number, Street, City, State, and ZIP Code) 20 Industrial Drive Smithfield RI 02917	
CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS Clepo 204-B
CHEMICAL FAMILY	FORMULA

SECTION II HAZARDOUS INGREDIENTS					
PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV (Units)

SECTION III PHYSICAL DATA			
BOILING POINT (°F.)	NA	SPECIFIC GRAVITY (H ₂ O = 1)	
VAPOR PRESSURE (mm Hg.)	NA	PERCENT VOLATILE BY VOLUME (%)	
VAPOR DENSITY (AIR = 1)	NA	EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER	Insoluble		
APPEARANCE AND ODOR Pale yellow powder			

SECTION IV FIRE AND EXPLOSION HAZARD DATA			
FLASH POINT (Method used)	None	FLAMMABLE LIMITS	Lel
EXTINGUISHING MEDIA	Water		
SPECIAL FIRE FIGHTING PROCEDURES Mildly oxidizing organic nitro compound. Once ignited, fire could be self sustaining.			
UNUSUAL FIRE AND EXPLOSION HAZARDS Complete saturation with water is needed for extinction.			

TRW-00600

The data in this Material Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process.

0908-1966

SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

EFFECTS OF OVEREXPOSURE

EMERGENCY AND FIRST AID PROCEDURES

Flush with water.

SECTION VI REACTIVITY DATA

STABILITY

UNSTABLE

CONDITIONS TO AVOID

STABLE

X

INCOMPATIBILITY (Materials to avoid)

HAZARDOUS DECOMPOSITION PRODUCTS

In a fire nitrogen oxides may be released.

HAZARDOUS
POLYMERIZATION

MAY OCCUR

CONDITIONS TO AVOID

WILL NOT OCCUR

X

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Sweep up and drum. Do not discard with easily oxidizable materials
such as sawdust or paper.

WASTE DISPOSAL METHOD See 204-N

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)

Dust respirator when handling powder.

VENTILATION

LOCAL EXHAUST

Advisable

SPECIAL

MECHANICAL (General)

OTHER

PROTECTIVE GLOVES

Rubber or Neoprene

EYE PROTECTION

Goggles

OTHER PROTECTIVE EQUIPMENT

Rubber aprons and boots

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Keep dry. Do not store with

strong reducers or flammables.

OTHER PRECAUTIONS

TRW-00601

0908-1967

U.S. DEPARTMENT OF LABOR

Occupational Safety & Health Administration

MATERIAL SAFETY DATA SHEET

SECTION I	
MANUFACTURER'S NAME Frederick Gumm Chemical Company Inc.	EMERGENCY TELEPHONE NO. 401-232-0606
ADDRESS (Number, Street, City, State, and ZIP Code) 20 Industria Drive Smithfield RI 02917	
CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS Epo 204-N
CHEMICAL FAMILY	FORMULA

SECTION II HAZARDOUS INGREDIENTS					
PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV (Units)
ethylene Diamine				33	25mg

SECTION III PHYSICAL DATA			
BOILING POINT (°F.)	212°	SPECIFIC GRAVITY (H ₂ O = 1)	.983
VAPOR PRESSURE (mm Hg.)	NA	PERCENT VOLATILE BY VOLUME (%)	99%
VAPOR DENSITY (AIR = 1)	NA	EVAPORATION RATE (Water = 1)	1.0
SOLUBILITY IN WATER	Complete		
APPEARANCE AND ODOR	Brown liquid strong odor		

SECTION IV FIRE AND EXPLOSION HAZARD DATA					
FLASH POINT (Method used)	None	FLAMMABLE LIMITS	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Lel</td> <td style="width: 50%;">Uel</td> </tr> </table>	Lel	Uel
Lel	Uel				
EXTINGUISHING MEDIA	NA				
SPECIAL FIRE FIGHTING PROCEDURES	NA				
ADDITIONAL FIRE AND EXPLOSION HAZARDS					
None					

TRW-00602

0908-1968

The data in this Material Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process.

SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE 75 mg/M³ calc.

EFFECTS OF OVEREXPOSURE Burns to skin and eyes

EMERGENCY AND FIRST AID PROCEDURES Flush with copious amounts of water.

SECTION VI REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	

INCOMPATIBILITY (Materials to avoid)

HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII SPILL OR LEAK PROCEDURES

ACTION TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Wash with water

WASTE DISPOSAL METHOD Neutralize to locally acceptable pH and dump to drain

Used solutions will require special procedures to remove heavy metal.

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)

VENTILATION	LOCAL EXHAUST	advisable	SPECIAL
	MECHANICAL (General)		OTHER

PROTECTIVE GLOVES Rubber or Neoprene EYE PROTECTION goggles

OTHER PROTECTIVE EQUIPMENT Rubber aprons and boots

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING Keep from freezing.

OTHER PRECAUTIONS



FREDERICK GUMM CHEMICAL COMPANY, INC.
500 Forest Street • Kearny, NJ 07032
201-223-GUMM • In NJ 201-991-4171

Over 1200 metal finishing chemicals for surface preparation, plating, aluminum finishing, post finishing, and mass finishing. CLEPO 216-B

TECHNICAL

Post-It™ brand fax transmittal memo 7671		# of pages >	
To	Dick Russell	From	R D Saw
Co.	TRW	Co.	Gumm
Dept.		Phone #	901-223-0606
Fax #	617-494-5536	Fax #	

CLEPO 216-B is a very mildly alkaline rinsing aid and tarnish preventative for copper and its alloys. It is especially effective on brass. CLEPO 216-B is provided in a convenient liquid form.

CLEPO 216-B is used at concentrations of 1% by volume with water. Immersion times of 60 seconds at 140 deg F (60 deg C) or 15-30 seconds at 160-180 deg F (70-80 deg C) have produced excellent results. Shortening the rinse time may not give complete protection. Longer immersion times are not harmful. Equipment may be of plain steel.

Parts entering the CLEPO 216-B solution should have a neutral or faintly alkaline surface. Therefore, if parts have been bright dipped, they should be neutralized before final rinsing.

CLEPO 216-B solution may be operated and controlled as a maintained bath. However, the build-up of contaminants from drag-in and losses due to evaporation will result in decreasing effectiveness. Best results are obtained by discarding the final rinse and making it new at intervals determined by production requirements.

In hard water areas, continued operation of CLEPO 216-B solution at high temperatures may result in the formation of white spots due to the accumulation of hard water salts. If this problem arises, use of low temperature drying and CLEPO 216-B will generally eliminate the problem.

CAUTION

CLEPO 216-B concentrate contains a small percentage of caustic potash. Avoid contact of concentrate with skin or eyes. In the event of contact, flush thoroughly with water. For eyes flush thoroughly with water and get medical attention.

WASTE DISPOSAL INFORMATION

CLEPO 216-B contains no chromates, cyanides, fluorides, phosphates, silicates or phenolic compounds. All surface active agents are biodegradable. Total alkalinity of the concentrate to a phenolphthalein endpoint is 2.5% w/w as K2O.

The information presented herein was prepared by technically knowledgeable personnel and to the best of our knowledge is true and accurate. It is not intended to be all-inclusive, and the manner and conditions of use and handling may involve other or additional considerations.

TRW-00604

Friedrich-Gunn Chemical Company, Inc.
528 FOREST STREET, KEARNY, NEW JERSEY 07032

U.S. DEPARTMENT OF LABOR
WORKPLACE STANDARDS ADMINISTRATION
BUREAU OF LABOR STANDARDS

FORM NO. C144-20 MODIFIED
MAY 1971

MATERIAL SAFETY DATA SHEET

MDC CONTROL NO. _____

SECTION I: MATERIAL AND MANUFACTURER IDENTIFICATION

MANUFACTURER'S NAME FRIEDRICH-GUNN CHEMICAL COMPANY, INC.		EMERGENCY TELEPHONE NO. 201-991-4171
ADDRESS (NUMBER, STREET, CITY, STATE AND ZIP CODE) 528 FOREST STREET KEARNY, NEW JERSEY 07032		
CHEMICAL NAME AND SYNONYMS		TRADE NAME AND SYNONYMS CLEPO ULTRASTRIP 252
CHEMICAL FAMILY Chlorinated Paint Stripper		FORMULA

SECTION II: HAZARDOUS INGREDIENTS*

PAINTS, PRESERVATIVES, SOLVENTS	%	TLV (UNITS)	ALLOYS AND METALLIC COATINGS	%	TLV (UNITS)
Pigment			BASE METAL		
SPRAY			ALLOYS		
VEHICLE			METALLIC COATINGS		
ADDITIONS			FILLER METAL PLUS COATING OR CORE FLUX		
OTHERS			OTHERS		
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES*				W/W	TLV (UNITS)
Cyclohexanone				10%	50 ppm
Methylene Chloride				70%	500 ppm
Formic Acid				10%	5 ppm

SECTION III: PHYSICAL DATA

BOILING POINT (°F)	Approx. 110°F	SPECIFIC GRAVITY (H ₂ O = 1)	Approx. 1.2
VAPOR PRESSURE (mm Hg.)	NA	PERCENT VOLATILE BY VOLUME (%)	96%
VAPOR DENSITY (AIR = 1)	Approx. 3.3	EVAPORATION RATE (_____ = 1)	Very low-wax seal included
SOLUBILITY IN WATER	Dispersible		
APPEARANCE AND ODOR	Dark Liquid - strong biting odor		

SECTION IV: FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED)	None	FLAMMABLE LIMITS	Le	Uel
EXTINGUISHING MEDIA	NA			
SPECIAL FIRE FIGHTING PROCEDURES	NA			

TRW-00605

USUAL FIRE AND EXPLOSION HAZARDS In case of fire, chlorinated solvent may generate phosgene if exposed to open flame.

PLEASE DO NOT USE GENERALIZATIONS SUCH AS PETROLEUM HYDROCARBONS, ALCOHOL, KETONES
US SPECIFIC CHEMICAL NAMES, SUCH AS METHANOL, BENZENE, PERCHLOROETHYLENE.

0908-1971

SECTION V: HEALTH HAZARD DATA

HRESPD D LIMIT VALUE

Estimated 500 ppm

EFFECTS OF OVEREXPOSURE

Causes blistering and peeling of skin

S

nausia and dizziness

EMERGENCY AND FIRST AID PROCEDURES

Flush with water and sterile sodium bicarbonate solution.

get to a

doctor. For inhalation, get to fresh air.

SECTION VI: REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	

INCOMPATIBILITY MATERIALS TO AVOID

Avoid contact with strong oxidizers or open flame.

HAZARDOUS DECOMPOSITION PRODUCTS

Contact with open flame may generate phosgene.

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII: SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

If possible, flush to drain. Alternate - absorb on sawdust, sweep up and discard.

WASTE DISPOSAL METHOD

Neutralize and go to drain if local restrictions permit. Alternate - use professional waste disposal service.

SECTION VIII: SPECIAL PROTECTION INFORMATION

EXHAUST OR PROTECTION SPECIFY TYPE

VENTILATION	LOCAL EXHAUST	X	SPECIAL
	MECHANICAL (GENERAL)		OTHER

PROTECTIVE CLOVES

Rubber, Neoprene or canvas coated with polyethylene

EYE PROTECTION

Goggles or Faceshield.

OTHER PROTECTIVE EQUIPMENT

Apron and boots depending on conditions

SECTION IX: SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Store in cool place. Do not store with strong oxidizers or flammable materials.

OTHER PRECAUTIONS

TRW-00606

1/83

PREPARED BY

F. M. J. J. J.

DATE

0908-1972

MATERIAL SAFETY DATA SHEET *Viuc 9*

SECTION 1 - IDENTIFICATION DATA

FREDERICK GUMM ~~CHEMICAL~~ COMPANY, INC.
 318 Third Street, Kearny, NJ 07032

Emergency Telephone Numbers:
 0100 AM 5100 PM EST
 (201) 991-4171
 24 Hrs: (313) 644-5626

CLEPO 425-A

HAZARD CLASS - Cleaning Compound M.D.B.
 CHEMICAL FAMILY - Liquid Cleaner
 CHEMICAL NAME/SYNONYMS - CLEPO 425-A
 TRADE NAME - *Viuc 9*
 MSDS REVIEWED BY - Keith Frey, V.P. Quality & Regulatory Affairs
 Effective Date: 01-30-77

SECTION 2 - PHYSICAL DATA

BOILING POINT (Deg F) - Over 212 degrees F
 VAPOR PRESSURE (mm Hg) - NA
 VAPOR DENSITY (air=1) - NA
 SOLUBILITY IN WATER - Complete
 SPECIFIC GRAVITY (H2O=1) - 1.01
 VOLATILE BY VOLUME - 33%
 EVAPORATION RATE (H2O=1) - 1

APPEARANCE & ODOR:
 yellowish liquid

SECTION 3 - FIRE AND EXPLOSION DATA

FLASH POINT - None

EXTINGUISHING MEDIA:

This product is not combustible. SEE SPECIAL FIRE FIGHTING PROCEDURES.

SPECIAL FIRE FIGHTING PROCEDURES:

Protective clothing and self-contained breathing apparatus should be worn by firefighters in areas where product is stored. Water spray, foam, dry chemical, or carbon dioxide may be used in areas where product is stored.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

None

NFPA HAZARD CLASSIFICATION:

Health (Blue) - 1
 Flammability (Red) - 0
 Reactivity (Yellow) - 0

DEGREE OF HAZARD

4=Extreme
 3=High
 2=Moderate
 1=Slight
 0=Insignificant

0908-1973

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SECTION 4 - REACTIVITY DATA

=====

STABILITY: Stable

CONDITIONS TO AVOID: NA

INCOMPATIBILITY:

Strong acids, strong oxidizers.

HAZARDOUS DECOMPOSITION PRODUCTS:

None identified.

HAZARDOUS POLYMERIZATION: Will not occur

CONDITIONS TO AVOID: NA

=====

SECTION 5 - HAZARDOUS COMPONENTS

=====

PAINTS, PRESERVATIVES, AND SOLVENTS:

NA

ALLOYS AND METALLIC COATINGS:

NA

HAZARDOUS COMPONENTS

%-Diethanolamine

Ethyl Alcohol

CAS NUMBER

111-42-2-9

64-17-5

TLV

3

1000

PEL

NF

1000

LD50

NF

7060

%

0.47

0.77

TLV = Mg/M3 - PEL = Mg/M3 - LD50 = oral, rat, Mg/Kg - NF = None Found

- The indicated material, if any, is listed as a carcinogen or potential carcinogen by one or more of the following: National Toxicology Program, I.A.R.C. Monographs, OSHA.

** - The indicated material, if any, does not have an established TLV, but does appear on one or more of the following states hazardous substance lists: Connecticut, Illinois, Michigan, Maine, Massachusetts, Minnesota, New Hampshire, New Jersey, New York, Oregon, Rhode Island, West Virginia, and Wisconsin, and is present in this product in amounts greater than 1%.

& - The indicated material, if any, is subject to the reporting requirements of SARA Title III, Section 313

=====

SECTION 6 - SPILL, LEAK, AND DISPOSAL PROCEDURES

=====

SPILL & LEAK PROCEDURES:

Liquids should be contained and adsorbed with a suitable adsorbent, or flushed to the waste treatment area. Flush area with plenty of water. Avoid all personal contact.

TRW-00608

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SECTION 6 - SPILL, LEAK, AND DISPOSAL PROCEDURES continued

=====

WASTE DISPOSAL METHODS:

Waste solution should not be discharged into sewers or streams. Solution should first be neutralized to a safely acceptable pH, and then well diluted with water. Depending on usage and locality, may also require precipitation and filtration of heavy metals. In doubt, contact local waste disposal contractor.

=====

SECTION 7 - HEALTH HAZARD DATA

=====

ROUTES OF EXPOSURE

INHALATION: Inhaling mist or spray is irritating to the upper respiratory tract and depending on the severity of exposure, may cause tissue damage.

SKIN CONTACT: This product is irritating to tissues contacted and may cause skin damage.

SKIN ABSORPTION: See SKIN CONTACT above.

EYE CONTACT: This product is irritating to eye tissues on contact. May cause permanent eye damage.

INGESTION: This product, if swallowed, will be irritating to the mouth, throat, and stomach.

EFFECTS OF OVEREXPOSURE

ACUTE: Irritating to all body tissues with which it comes in contact.

CHRONIC: Repeated or prolonged exposure may cause dermatitis.

EMERGENCY AND FIRST AID PROCEDURES

EYES: IMMEDIATELY flush eyes with large amounts of water for at least 15 minutes, holding lids apart to ensure flushing of the entire surface. Washing eyes within 1 minute is essential to achieve maximum effectiveness. Seek medical attention immediately.

SKIN: Immediately wash contaminated areas with plenty of water for 15 minutes. Remove contaminated clothing and footwear, and wash clothing before reuse. Discard any clothing that can not be decontaminated. Seek medical attention immediately.

INHALATION: Get person out of contaminated area to fresh air. If breathing has stopped, resuscitate and administer oxygen if readily available. Seek medical attention immediately.

INGESTION: NEVER give anything by mouth to an unconscious person. If swallowed, do not induce vomiting. Give large quantities of water. If vomiting occurs spontaneously, keep airway clear. Seek medical attention immediately.

TRW-00609

=====

SECTION 8 - SPECIAL HANDLING PROCEDURES

=====

ESPIRATORY: Respiration protection is not required under normal use. Use NIOSH/MSHA approved respirator if mist or spray may be generated above the TLV limit.

VENTILATION: Use adequate local exhaust ventilation where mist or spray may be generated, to maintain level below the TLV limit.

GLOVES: Impervious gloves should be worn (ex. rubber or neoprene).

EYES: Chemical safety goggles and/or face shield.

OTHER: Chemically resistant shoes and apron. Safety showers and eyewash facilities should be accessible. All contaminated clothing should be washed with soap and water, and dried before reuse.

=====

SECTION 9 - SPECIAL PRECAUTIONS

=====

HANDLING AND STORAGE PRECAUTIONS::

Avoid contact with skin and eyes. Wash thoroughly after handling material. Store in a cool, dry area, in a closed container when not being used. DO NOT STORE with strong acids and oxidizers.

OTHER PRECAUTIONS:

Keep container tightly closed when not in use. Wash thoroughly after handling. Containers, even those that have been emptied, will retain product residue and vapors. Always obey hazard warnings and handle empty containers as if they were full. Containers must not be used for any other purpose.

The information herein is based on technical data that is believed to be reliable. It is intended for use by persons having technical skill and at their own discretion and risk. Since conditions of use are outside our control, we make no warranties, expressed or implied, and assume no liability in connection with the use of this information.

MATERIAL SAFETY DATA SHEET

RECEIVED

JUN - 2 1992

SECTION 1 - IDENTIFICATION DATA

FREDERICK GUMM CHEMICAL COMPANY, INC.
538 Forest Street, Kearny, NJ 07032

CLEPO 453-G

Emergency Telephone Numbers:
CHEMTREC 800-424-9300 (24HR)
8:00 AM - 5:00 PM EST
201-991-4174 Information

D.O.T. HAZARD CLASS - Cleaner Liquid NOS
CHEMICAL FAMILY - Alkaline Cleaner Liquid
CHEMICAL NAME/SYNONYMS - CLEPO 453-G
FORMULA - Mixture
MSDS REVIEWED BY - Keith Frey, V.P. Quality & Regulatory Affairs

Effective Date:
01-30-90

SECTION 2 - PHYSICAL DATA

BOILING POINT (Deg F) - Over 212 deg F
VAPOR PRESSURE (mm Hg) - NA
VAPOR DENSITY (air=1) - NA
SOLUBILITY IN WATER - Complete
SPECIFIC GRAVITY (H2O=1) - APPROX. 1.007
VOLATILE BY VOLUME - 94%
EVAPORATION RATE (H2O=1) - >1

APPEARANCE & ODOR:
Clear liquid.

Post-It™ brand fax transmittal memo 7671		# of pages > 4
To	Richard Russell	From
Co.	TRW FRIEN	Co.
Dept.		Phone #
Fax #		Fax #

SECTION 3 - FIRE AND EXPLOSION DATA

FLASH POINT - None

EXTINGUISHING MEDIA:

This product is not combustible. See SPECIAL FIRE FIGHTING PROCEDURES.

SPECIAL FIRE FIGHTING PROCEDURES:

Protective clothing and self-contained breathing apparatus should be worn by firefighters in areas where product is stored. Water spray, foam, dry chemical, or carbon dioxide may be used in areas where product is stored.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

None

NFPA HAZARD CLASSIFICATION:

Health (Blue) - 1
Flammability (Red) - 0
Reactivity (Yellow) - 0

DEGREE OF HAZARD

4=Extreme
3=High
2=Moderate
1=Slight
0=Insignificant

TRW-00611

=====

SECTION 4 - REACTIVITY DATA

=====

STABILITY: Stable

CONDITIONS TO AVOID: NA

INCOMPATIBILITY:

Strong acids.

HAZARDOUS DECOMPOSITION PRODUCTS:

None expected.

HAZARDOUS POLYMERIZATION: Will not occur

CONDITIONS TO AVOID: NA

=====

SECTION 5 - HAZARDOUS COMPONENTS

=====

PAINTS, PRESERVATIVES, AND SOLVENTS:

NA

ALLOYS AND METALLIC COATINGS:

NA

HAZARDOUS COMPONENTS

CAS NUMBER

TLV

PEL

LD50

*

NONE

TLV = Mg/M3 - PEL = Mg/M3 - LD50 = oral, rat, Mg/Kg - NF = None Found

- The indicated material, if any, is listed as a carcinogen or potential carcinogen by one or more of the following: National Toxicology Program, I.A.R.C. Monographs, OSHA.

** - The indicated material, if any, does not have an established TLV, but does appear on one or more of the following states hazardous substance lists: Connecticut, Illinois, Michigan, Maine, Massachusetts, Minnesota, New Hampshire, New Jersey, New York, Oregon, Rhode Island, West Virginia, and Wisconsin, and is present in this product in amounts greater than 1%.

& - The indicated material, if any, is subject to the reporting requirements of SARA Title III, Section 313

=====

SECTION 6 - SPILL, LEAK, AND DISPOSAL PROCEDURES

=====

SPILL & LEAK PROCEDURES:

Liquids should be contained and adsorbed with a suitable adsorbent, or flushed to the waste treatment area. Flush area with plenty of water. Avoid all personal contact.

TRW-00612

WASTE DISPOSAL METHODS:

Waste solution should not be discharged into sewers or streams. Solution should first be neutralized to a locally acceptable pH, and then well diluted with water. Depending on usage and locality, may also require precipitation and filtration of heavy metals. Otherwise, contact local

=====

SECTION 6 - SPILL, LEAK, AND DISPOSAL PROCEDURES continued

waste disposal contractor.

=====

SECTION 7 - HEALTH HAZARD DATA

=====

ROUTES OF EXPOSURE

INHALATION: Inhaling mist or spray is irritating to the upper respiratory tract and depending on the severity of exposure, may cause tissue damage.

SKIN CONTACT: This product is irritating to tissues contacted and may cause skin damage.

SKIN ABSORPTION: See SKIN CONTACT above.

EYE CONTACT: This product is irritating to eye tissues on contact. May cause permanent eye damage.

INGESTION: This product, if swallowed, will be irritating to the mouth, throat, and stomach.

EFFECTS OF OVEREXPOSURE

ACUTE: Irritating to all body tissues with which it comes in contact.

CHRONIC: Repeated or prolonged exposure may cause dermatitis.

EMERGENCY AND FIRST AID PROCEDURES

EYES: IMMEDIATELY flush eyes with large amounts of water for at least 15 minutes, holding lids apart to ensure flushing of the entire surface. Washing eyes within 1 minute is essential to achieve maximum effectiveness. Seek medical attention immediately.

SKIN: Immediately wash contaminated areas with plenty of water for 15 minutes. Remove contaminated clothing and footwear, and wash clothing before reuse. Discard any clothing that can not be decontaminated. Seek medical attention immediately.

INHALATION: Get person out of contaminated area to fresh air. If breathing has stopped, resuscitate and administer oxygen if readily available. Seek medical attention immediately.

INGESTION: NEVER give anything by mouth to an unconscious person. If swallowed, do not induce vomiting. Give large quantities of water. If vomiting occurs spontaneously, keep airway clear. Seek medical attention immediately.

0908-1979

TRW-00613

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SECTION 8 - SPECIAL HANDLING PROCEDURES

RESPIRATORY: Respiration protection is not required under normal use.
Use NIOSH/MSHA approved respirator where mist or spray may be generated above the TLV limit.

VENTILATION: Use adequate local exhaust ventilation where mist or spray may be generated, to maintain level below the TLV limit.

GLOVES: Impervious gloves should be worn (ex. rubber or neoprene).

EYES: Chemical safety goggles and/or face shield.

OTHER: Chemically resistant shoes and apron. Safety showers and eyewash facilities should be accessible. All contaminated clothing should be washed with soap and water, and dried before reuse.

=====

SECTION 9 - SPECIAL PRECAUTIONS

=====

HANDLING AND STORAGE PRECAUTIONS::

Avoid contact with skin and eyes. Wash thoroughly after handling material.
Store in a cool, dry area, in a closed container when not being used.
DO NOT STORE with strong acids.

OTHER PRECAUTIONS:

Keep container tightly closed when not in use. Wash thoroughly after handling. Containers, even those that have been emptied, will retain product residue and vapors. Always obey hazard warnings and handle empty containers as if they were full. Containers must not be used for any other purpose.

The information herein is based on technical data that is believed to be reliable. It is intended for use by persons having technical skill and at their own discretion and risk. Since conditions of use are outside our control, we make no warranties, expressed or implied, and assume no liability in connection with the use of this information.

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TRW-00614

0908-1980

MATERIAL SAFETY DATA SHEET

SECTION 1 - IDENTIFICATION DATA

FREDERICK GUMM CHEMICAL COMPANY, INC.
538 Forest Street, Kearny, NJ 07032

CLEPO 453-L

Emergency Telephone Numbers:
CHEMTREC 800-424-9300 (24HR)
8:00 AM - 5:00 PM EST
201-991-4174 Information

D.O.T. HAZARD CLASS - Cleaner Liquid NOS
CHEMICAL FAMILY - Alkaline Cleaner Liquid
CHEMICAL NAME/SYNONYMS - CLEPO 453-L
FORMULA - Mixture
MSDS REVIEWED BY - Keith Frey, V.P. Quality & Regulatory Affairs

Effective Date:
01-30-90

SECTION 2 - PHYSICAL DATA

BOILING POINT (Deg F) - Over 212 deg F
VAPOR PRESSURE (mm Hg) - NA
VAPOR DENSITY (air=1) - NA
SOLUBILITY IN WATER - Complete
SPECIFIC GRAVITY (H2O=1) - 1.04
VOLATILE BY VOLUME - 94%
EVAPORATION RATE (H2O=1) - <1

APPEARANCE & ODOR:
Clear liquid.

Post-It™ brand fax transmittal memo 7671 # of pages 4	
To <i>Richard Russell</i>	From <i>KEITH FREY</i>
Co. <i>TRW FORTEN</i>	Co. <i>F. GUMM CHEMICAL</i>
Dept.	Phone #
Fax #	Fax #

SECTION 3 - FIRE AND EXPLOSION DATA

FLASH POINT - None

EXTINGUISHING MEDIA:

This product is not combustible. See SPECIAL FIRE FIGHTING PROCEDURES.

SPECIAL FIRE FIGHTING PROCEDURES:

Protective clothing and self-contained breathing apparatus should be worn by firefighters in areas where product is stored. Water spray, foam, dry chemical, or carbon dioxide may be used in areas where product is stored.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

None

NFPA HAZARD CLASSIFICATION:

Health (Blue) - 1
Flammability (Red) - 0
Reactivity (Yellow) - 0

DEGREE OF HAZARD

4=Extreme
3=High
2=Moderate
1=Slight
0=Insignificant

=====

SECTION 4 - REACTIVITY DATA

=====

STABILITY: Stable
CONDITIONS TO AVOID: NA

INCOMPATIBILITY:
Strong acids.

HAZARDOUS DECOMPOSITION PRODUCTS:
None expected.

HAZARDOUS POLYMERIZATION: Will not occur
CONDITIONS TO AVOID: NA

=====

SECTION 5 - HAZARDOUS COMPONENTS

=====

PAINTS, PRESERVATIVES, AND SOLVENTS:
NA
ALLOYS AND METALLIC COATINGS:
NA

HAZARDOUS COMPONENTS	CAS NUMBER	TLV	PEL	LD50	%
NONE					

TLV = Mg/M3 - PEL = Mg/M3 - LD50 = oral, rat, Mg/Kg - NF = None Found

- The indicated material, if any, is listed as a carcinogen or potential carcinogen by one or more of the following: National Toxicology Program, I.A.R.C. Monographs, OSHA.

** - The indicated material, if any, does not have an established TLV, but does appear on one or more of the following states hazardous substance lists: Connecticut, Illinois, Michigan, Maine, Massachusetts, Minnesota, New Hampshire, New Jersey, New York, Oregon, Rhode Island, West Virginia, and Wisconsin, and is present in this product in amounts greater than 1%.

& - The indicated material, if any, is subject to the reporting requirements of SARA Title III, Section 313

=====

SECTION 6 - SPILL, LEAK, AND DISPOSAL PROCEDURES

=====

SPILL & LEAK PROCEDURES:

Liquids should be contained and adsorbed with a suitable adsorbent, or flushed to the waste treatment area. Flush area with plenty of water. Avoid all personal contact.

WASTE DISPOSAL METHODS:

Waste solution should not be discharged into sewers or streams. Solution should first be neutralized to a locally acceptable pH, and then well diluted with water. Depending on usage and locality, may also require precipitation and filtration of heavy metals. Otherwise, contact local

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SECTION 6 - SPILL, LEAK, AND DISPOSAL PROCEDURES continued

=====

waste disposal contractor.

=====

SECTION 7 - HEALTH HAZARD DATA

=====

ROUTES OF EXPOSURE

INHALATION: Inhaling mist or spray is irritating to the upper respiratory tract and depending on the severity of exposure, may cause tissue damage.

SKIN CONTACT: This product is irritating to tissues contacted and may cause skin damage.

SKIN ABSORPTION: See SKIN CONTACT above.

EYE CONTACT: This product is irritating to eye tissues on contact. May cause permanent eye damage.

INGESTION: This product, if swallowed, will be irritating to the mouth, throat, and stomach.

EFFECTS OF OVEREXPOSURE

ACUTE: Irritating to all body tissues with which it comes in contact.

CHRONIC: Repeated or prolonged exposure may cause dermatitis.

EMERGENCY AND FIRST AID PROCEDURES

EYES: IMMEDIATELY flush eyes with large amounts of water for at least 15 minutes, holding lids apart to ensure flushing of the entire surface. Washing eyes within 1 minute is essential to achieve maximum effectiveness. Seek medical attention immediately.

SKIN: Immediately wash contaminated areas with plenty of water for 15 minutes. Remove contaminated clothing and footwear, and wash clothing before reuse. Discard any clothing that can not be decontaminated. Seek medical attention immediately.

INHALATION: Get person out of contaminated area to fresh air. If breathing has stopped, resuscitate and administer oxygen if readily available. Seek medical attention immediately.

INGESTION: NEVER give anything by mouth to an unconscious person. If swallowed, do not induce vomiting. Give large quantities of water. If vomiting occurs spontaneously, keep airway clear. Seek medical attention immediately.

TRW-00617

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SECTION 8 - SPECIAL HANDLING PROCEDURES

=====

RESPIRATORY: Respiration protection is not required under normal use.
Use NIOSH/MSHA approved respirator where mist or spray may be generated above the TLV limit.

VENTILATION: Use adequate local exhaust ventilation where mist or spray may be generated, to maintain level below the TLV limit.

GLOVES: Impervious gloves should be worn (ex. rubber or neoprene).

EYES: Chemical safety goggles and/or face shield.

OTHER: Chemically resistant shoes and apron. Safety showers and eyewash facilities should be accessible. All contaminated clothing should be washed with soap and water, and dried before reuse.

=====

SECTION 9 - SPECIAL PRECAUTIONS

=====

HANDLING AND STORAGE PRECAUTIONS::

Avoid contact with skin and eyes. Wash thoroughly after handling material.
Store in a cool, dry area, in a closed container when not being used.
DO NOT STORE with strong acids.

OTHER PRECAUTIONS:

Keep container tightly closed when not in use. Wash thoroughly after handling. Containers, even those that have been emptied, will retain product residue and vapors. Always obey hazard warnings and handle empty containers as if they were full. Containers must not be used for any other purpose.

The information herein is based on technical data that is believed to be reliable. It is intended for use by persons having technical skill and at their own discretion and risk. Since conditions of use are outside our control, we make no warranties, expressed or implied, and assume no liability in connection with the use of this information.

0908-1984

TRW-00618

page: 4

MATERIAL SAFETY DATA SHEET

SECTION 1 - IDENTIFICATION DATA

FREDERICK GUMM CHEMICAL COMPANY, INC.
538 Forest Street, Kearny, NJ 07032

Emergency Telephone Numbers:
8:00 AM - 5:00 PM EST
(201) 991-4174
24 Hrs: (313) 644-5626

CLEPO 481-S

D.O.T. HAZARD CLASS - Corrosive Solid NOS
CHEMICAL FAMILY - Caustic cleaner
CHEMICAL NAME/SYNONYMS - CLEPO 481-S
FORMULA - Mixture
MSDS REVIEWED BY - Keith Frey, V.P. Quality & Regulatory Affairs

Effective Date:
01-30-90

SECTION 2 - PHYSICAL DATA

BOILING POINT (Deg F) - NA
VAPOR PRESSURE (mm Hg) - NA
VAPOR DENSITY (air=1) - NA
SOLUBILITY IN WATER - Complete to 32 oz/gal
SPECIFIC GRAVITY (H2O=1) - NA
VOLATILE BY VOLUME - NA
EVAPORATION RATE (H2O=1) - NA

APPEARANCE & ODOR:
Off white powder

SECTION 3 - FIRE AND EXPLOSION DATA

FLASH POINT - None

EXTINGUISHING MEDIA:
This product is not combustible.

SPECIAL FIRE FIGHTING PROCEDURES:

Protective clothing and self-contained breathing apparatus should be worn by firefighters in areas where product is stored. Water spray, foam, dry chemical, or carbon dioxide may be used in areas where product is stored.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

Will react with some metals, i.e. aluminum, tin and zinc, to release flammable hydrogen gas.

NFPA HAZARD CLASSIFICATION:

Health (Blue) - 3
Flammability (Red) - 0
Reactivity (Yellow) - 1

DEGREE OF HAZARD

4=Extreme
3=High
2=Moderate
1=Slight
0=Insignificant

SECTION 4 - REACTIVITY DATA

STABILITY: Stable
CONDITIONS TO AVOID: NA

INCOMPATIBILITY:

Strong acids, flammable liquids, certain metals, and organic halogenated compounds. Contact with nitro compounds may form shock sensitive salts.

HAZARDOUS DECOMPOSITION PRODUCTS:

None

HAZARDOUS POLYMERIZATION: Will not occur
CONDITIONS TO AVOID: NA

SECTION 5 - HAZARDOUS COMPONENTS

PAINTS, PRESERVATIVES, AND SOLVENTS:

NA

ALLOYS AND METALLIC COATINGS:

NA

HAZARDOUS COMPONENTS

Sodium Hydroxide (Caustic Soda)
Sodium Silicate
Sodium Dodecylbenzene Sulfonate

CAS NUMBER	TLV	PEL	LD50	%
1310-73-2	C 2	2	240	50.0
6834-92-0	C 2	2	600	8.00
25155-30-0	NP	NP	650	1.25

TLV = Mg/M3 - PEL = Mg/M3 - LD50 = oral, rat, Mg/Kg - NP = None Found

- The indicated material, if any, is listed as a carcinogen or potential carcinogen by one or more of the following: National Toxicology Program, I.A.R.C. Monographs, OSHA.

** - The indicated material, if any, does not have an established TLV, but does appear on one or more of the following states hazardous substance lists: Connecticut, Illinois, Michigan, Maine, Massachusetts, Minnesota, New Hampshire, New Jersey, New York, Oregon, Rhode Island, West Virginia, and Wisconsin, and is present in this product in amounts greater than 1%.

& - The indicated material, if any, is subject to the reporting requirements of SARA Title III, Section 313

SECTION 6 - SPILL, LEAK, AND DISPOSAL PROCEDURES

SPILL & LEAK PROCEDURES:

Spilled powders may be shoveled up, and stored in closed containers for possible normal use or proper disposal. Liquids should be contained and adsorbed with a suitable adsorbent, or flushed to waste treatment area. Flush area with plenty of water. Dilute mineral acid may be used to neutralize final traces immediately after flushing.

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SECTION 6 - SPILL, LEAK, AND DISPOSAL PROCEDURES continued

=====

WASTE DISPOSAL METHODS:

Caustic waste solution should not be discharged into sewers or streams. Caustic should first be neutralized with dilute acid to a locally acceptable pH, and then well diluted with water. Depending on usage and locality, may also require precipitation and filtration of heavy metals. Otherwise, contact local waste disposal contractor.

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SECTION 7 - HEALTH HAZARD DATA

=====

ROUTES OF EXPOSURE

INHALATION: Airborne concentrations of dust, mist, or spray of this product may cause damage to the upper respiratory tract and even to the lung tissue which could produce chemical pneumonia depending upon severity of exposure.

SKIN CONTACT: This product is destructive to tissues contacted and produces severe burns.

SKIN ABSORPTION: See SKIN CONTACT above.

EYE CONTACT: This product is destructive to eye tissues on contact. Will cause severe burns that result in damage to the eyes and even blindness.

INGESTION: This product, if swallowed, can cause severe burns and complete tissue perforation of mucous membranes of the mouth, throat, esophagus, and stomach.

EFFECTS OF OVEREXPOSURE

ACUTE: Corrosive to all body tissues with which it comes in contact.

CHRONIC: The chronic local effect may consist of multiple areas of superficial destruction of the skin or of primary irritant dermatitis. Similarly, inhalation of dust, spray, or mist may result in varying degrees of irritation or damage to the respiratory tract tissues.

 **EMERGENCY AND FIRST AID PROCEDURES**

EYES: **IMMEDIATELY*** flush eyes with large amounts of water for at least 15 minutes, holding lids apart to ensure flushing of the entire surface. Washing eyes within 1 minute is essential to achieve maximum effectiveness. Seek medical attention immediately.

SKIN: Immediately wash contaminated areas with plenty of water for 15 minutes. Remove contaminated clothing and footwear, and wash clothing before reuse. Discard any clothing that can not be decontaminated. Seek medical attention immediately.

INHALATION: Get person out of contaminated area to fresh air. If breathing has stopped, resuscitate and administer oxygen if readily available. Seek medical attention immediately.

=====

SECTION 7 - HEALTH HAZARD DATA continued

=====

INGESTION: NEVER give anything by mouth to an unconscious person. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. If available, give several glasses of milk. If vomiting occurs spontaneously, keep airway clear. Seek medical attention immediately.

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=====

SECTION 8 - SPECIAL HANDLING PROCEDURES

=====

RESPIRATORY: Respiration protection is not required under normal use. Use NIOSH/MSHA approved respirator where dust, mist, or spray may be generated above TLV limit.

VENTILATION: Use adequate local exhaust ventilation where dust, mist, or spray may be generated, to maintain level below TLV limit.

GLOVES: Impervious gloves should be worn (ex. rubber or neoprene).

EYES: Chemical safety goggles and/or face shield.

OTHER: Chemically resistant shoes and apron. Safety showers and eyewash facilities should be accessible. All contaminated clothing should be washed with soap and water, and dried before reuse.

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SECTION 9 - SPECIAL PRECAUTIONS

=====

HANDLING AND STORAGE PRECAUTIONS::

Avoid contact with strong acids and flammable liquids. May react with tin, zinc, magnesium, and aluminum, generating hydrogen gas which is explosive.

FOR POWDERS:

1. To prepare solutions, this material dissolves with the liberation of much heat. Add material slowly with constant stirring, to avoid violent splattering.
2. Store in a cool dry area, in a closed container.

OTHER PRECAUTIONS:

Keep container tightly closed when not in use. Wash thoroughly after handling. Containers, even those that have been emptied, will retain product residue and vapors. Always obey hazard warnings and handle empty containers as if they were full. Containers must not be used for any other purpose.

The information herein is based on technical data that is believed to be reliable. It is intended for use by persons having technical skill and at their own discretion and risk. Since conditions of use are outside our control, we make no warranties, expressed or implied, and assume no liability in connection with the use of this information.

0908-1988

MATERIAL SAFETY DATA SHEET

SECTION 1 - IDENTIFICATION DATA

FREDERICK GUMM CHEMICAL COMPANY, INC.
538 Forest Street, Kearny, NJ 07032

Emergency Telephone Numbers:
8:00 AM - 5:00 PM EST
(201) 991-4171
24 Hrs: (313) 611-3626

CLEPO 487-R

Effective Date:
01-30-90

D.O.T. HAZARD CLASS - Corrosive Solid NOS
CHEMICAL FAMILY - Caustic cleaner
CHEMICAL NAME/SYNONYMS - CLEPO 487-R
FORMULA - Mixture
MSDS REVIEWED BY - Keith Frey, V.P. Quality & Regulatory Affairs

SECTION 2 - PHYSICAL DATA

BOILING POINT (Deg F) - NA
VAPOR PRESSURE (mm Hg) - NA
VAPOR DENSITY (air=1) - NA
SOLUBILITY IN WATER - Complete to 32 oz/gal
SPECIFIC GRAVITY (H2O=1) - NA
VOLATILE BY VOLUME - NA
EVAPORATION RATE (H2O=1) - NA

APPEARANCE & ODOR:
Off white powder

SECTION 3 - FIRE AND EXPLOSION DATA

FLASH POINT - None

EXTINGUISHING MEDIA:
This product is not combustible.

SPECIAL FIRE FIGHTING PROCEDURES:

Protective clothing and self-contained breathing apparatus should be worn by firefighters in areas where product is stored. Water spray, foam, dry chemical, or carbon dioxide may be used in areas where product is stored.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

Will react with some metals, i.e. aluminum, tin and zinc, to release flammable hydrogen gas.

NFPA HAZARD CLASSIFICATION:

Health (Blue) - 3
Flammability (Red) - 0
Reactivity (Yellow) - 1

DEGREE OF HAZARD

4=Extreme
3=High
2=Moderate
1=Slight
0=Insignificant

0908-1989

SECTION 4 - REACTIVITY DATA

STABILITY: Stable

CONDITIONS TO AVOID: NA

INCOMPATIBILITY:

Strong acids, flammable liquids, certain metals, and organic halogenated compounds. Contact with nitro compounds may form shock sensitive salts.

HAZARDOUS DECOMPOSITION PRODUCTS:

None

HAZARDOUS POLYMERIZATION: Will not occur

CONDITIONS TO AVOID: NA

SECTION 5 - HAZARDOUS COMPONENTS

PAINTS, PRESERVATIVES, AND SOLVENTS:

NA

ALLOYS AND METALLIC COATINGS:

NA

HAZARDOUS COMPONENTS

Sodium Hydroxide (Caustic Soda)
Sodium Silicate

CAS NUMBER	TLV	PEL	LD50	%
1310-73-2	C 2	2	210	30.0
6834-92-0	C 2	2	600	11.0

TLV = Mg/M3 - PEL = Mg/M3 - LD50 = oral, rat, Mg/Kg - NP = None Found

- The indicated material, if any, is listed as a carcinogen or potential carcinogen by one or more of the following: National Toxicology Program, I.A.R.C. Monographs, OSHA.

** - The indicated material, if any, does not have an established TLV, but does appear on one or more of the following states hazardous substance lists: Connecticut, Illinois, Michigan, Maine, Massachusetts, Minnesota, New Hampshire, New Jersey, New York, Oregon, Rhode Island, West Virginia, and Wisconsin, and is present in this product in amounts greater than 1%.

& - The indicated material, if any, is subject to the reporting requirements of SARA Title III, Section 313

SECTION 6 - SPILL, LEAK, AND DISPOSAL PROCEDURES

SPILL & LEAK PROCEDURES:

Spilled powders may be shoveled up, and stored in closed containers for possible normal use or proper disposal. Liquids should be contained and adsorbed with a suitable adsorbent, or flushed to waste treatment area. Flush area with plenty of water. Dilute mineral acid may be used to neutralize final traces immediately after flushing.

=====

SECTION 6 - SPILL, LEAK, AND DISPOSAL PROCEDURES continued

=====

WASTE DISPOSAL METHODS:

Caustic waste solution should not be discharged into sewers or streams. Caustic should first be neutralized with dilute acid to a locally acceptable pH, and then well diluted with water. Depending on usage and locality, may also require precipitation and filtration of heavy metals. Otherwise, contact local waste disposal contractor.

=====

SECTION 7 - HEALTH HAZARD DATA

=====

ROUTES OF EXPOSURE

INHALATION: Airborne concentrations of dust, mist, or spray of this product may cause damage to the upper respiratory tract and even to the lung tissue which could produce chemical pneumonia depending upon severity of exposure.

SKIN CONTACT: This product is destructive to tissues contacted and produces severe burns.

SKIN ABSORPTION: See SKIN CONTACT above.

EYE CONTACT: This product is destructive to eye tissues on contact. Will cause severe burns that result in damage to the eyes and even blindness.

INGESTION: This product, if swallowed, can cause severe burns and complete tissue perforation of mucous membranes of the mouth, throat, esophagus, and stomach.

EFFECTS OF OVEREXPOSURE

ACUTE: Corrosive to all body tissues with which it comes in contact.

CHRONIC: The chronic local effect may consist of multiple areas of superficial destruction of the skin or of primary irritant dermatitis. Similarly, inhalation of dust, spray, or mist may result in varying degrees of irritation or damage to the respiratory tract tissues.

EMERGENCY AND FIRST AID PROCEDURES

EYES: IMMEDIATELY flush eyes with large amounts of water for at least 15 minutes, holding lids apart to ensure flushing of the entire surface. Washing eyes within 1 minute is essential to achieve maximum effectiveness. Seek medical attention immediately.

SKIN: Immediately wash contaminated areas with plenty of water for 15 minutes. Remove contaminated clothing and footwear, and wash clothing before reuse. Discard any clothing that can not be decontaminated. Seek medical attention immediately.

INHALATION: Get person out of contaminated area to fresh air. If breathing has stopped, resuscitate and administer oxygen if readily available. Seek medical attention immediately.

=====

SECTION 7 - HEALTH HAZARD DATA continued

=====

INGESTION: NEVER give anything by mouth to an unconscious person. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. If available, give several glasses of milk. If vomiting occurs spontaneously, keep airway clear. Seek medical attention immediately.

=====

SECTION 8 - SPECIAL HANDLING PROCEDURES

=====

RESPIRATORY: Respiration protection is not required under normal use. Use NIOSH/MSHA approved respirator where dust, mist, or spray may be generated above TLV limit.

VENTILATION: Use adequate local exhaust ventilation where dust, mist, or spray may be generated, to maintain level below TLV limit.

GLOVES: Impervious gloves should be worn (ex. rubber or neoprene).

EYES: Chemical safety goggles and/or face shield.

OTHER: Chemically resistant shoes and apron. Safety showers and eyewash facilities should be accessible. All contaminated clothing should be washed with soap and water, and dried before reuse.

=====

SECTION 9 - SPECIAL PRECAUTIONS

=====

HANDLING AND STORAGE PRECAUTIONS::

Avoid contact with strong acids and flammable liquids. May react with tin, zinc, magnesium, and aluminum, generating hydrogen gas which is explosive.

FOR POWDERS:

1. To prepare solutions, this material dissolves with the liberation of much heat. Add material slowly with constant stirring, to avoid violent splattering.
2. Store in a cool dry area, in a closed container.

OTHER PRECAUTIONS:

Keep container tightly closed when not in use. Wash thoroughly after handling. Containers, even those that have been emptied, will retain product residue and vapors. Always obey hazard warnings and handle empty containers as if they were full. Containers must not be used for any other purpose.

The information herein is based on technical data that is believed to be reliable. It is intended for use by persons having technical skill and at their own discretion and risk. Since conditions of use are outside our control, we make no warranties, expressed or implied, and assume no liability in connection with the use of this information.

TRW-00626

Frederick Gumm Chemical Company, Inc.
333 FOREST STREET, KEARNY, NEW JERSEY 07032

U.S. DEPARTMENT OF LABOR
WORKPLACE STANDARDS ADMINISTRATION
BUREAU OF LABOR STANDARDS
MATERIAL SAFETY DATA SHEET

CLEPO 507A
FORM NO. OSHA-201 MODIFIED
MAY 1971

MDC CONTROL NO. _____

CAT 43151

SECTION I: MATERIAL AND MANUFACTURER IDENTIFICATION

MANUFACTURER'S NAME Frederick Gumm Chemical Company, Inc.		EMERGENCY TELEPHONE NO. 201-991-4142
ADDRESS (NUMBER, STREET, CITY, STATE AND ZIP CODE) 538 Forest Street Kearny, N.J. 07032		
CHEMICAL NAME AND SYNONYMS		TRADE NAME AND SYNONYMS CLEPO 507-A
CHEMICAL FAMILY Acid Tumbling Compound	FORMULA	

SECTION II: HAZARDOUS INGREDIENTS*

PAINTS, PRESERVATIVES/SOLVENTS	%	TLV (UNITS)	ALLOYS AND METALLIC COATINGS	%	TLV (UNITS)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES*	% w/w	TLV (UNITS)
Sulfuric Acid	34%	1 mg/M ³

SECTION III: PHYSICAL DATA

BOILING POINT (°F) Over 212°F	SPECIFIC GRAVITY (H ₂ O = 1) 1.33
VAPOR PRESSURE (mm Hg.)	PERCENT VOLATILE BY VOLUME (%) 48% w/w
VAPOR DENSITY (AIR = 1)	EVAPORATION RATE (Water = 1) 1
SOLUBILITY IN WATER Complete	

APPEARANCE AND ODOR Clear liquid - slight acrid odor

SECTION IV: FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED) None	FLAMMABLE LIMITS None	LeI	UeI
EXTINGUISHING MEDIA			

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

None

*PLEASE DO NOT USE GENERALIZATIONS, SUCH AS PETROLEUM HYDROCARBONS, ALCOHOL, KETONES.
USE SPECIFIC CHEMICAL NAMES, SUCH AS METHANOL, BENZENE, PERCHLOROETHYLENE.

TRW-00627

0908-1993

SECTION V: HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

3 mg/M³ Calc.

EFFECTS OF OVEREXPOSURE Irritates mucous membranes. Continuous or repeated exposure can irritate skin. Avoid contact with skin or eyes.

EMERGENCY AND FIRST AID PROCEDURES

Flush thoroughly with water. For eyes get medical attention.

SECTION VI: REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	

INCOMPATIBILITY (MATERIALS TO AVOID)

Avoid strong alkalies

HAZARDOUS DECOMPOSITION PRODUCTS

None

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII: SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Flush to drain

WASTE DISPOSAL METHOD

Neutralize to acceptable pH and dump to drain.

SECTION VIII: SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (SPECIFY TYPE)

Not generally required

VENTILATION	LOCAL EXHAUST Not generally required	SPECIAL
	MECHANICAL (GENERAL)	OTHER

PROTECTIVE GLOVES

Rubber or neoprene

EYE PROTECTION

Goggles

OTHER PROTECTIVE EQUIPMENT

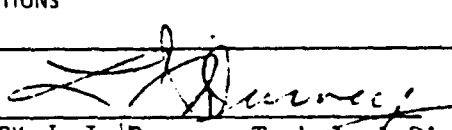
Depending on local conditions, rubber or neoprene apron and/or boots may be indicated.

SECTION IX: SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Do not store with strong alkalies. Keep from freezing.

OTHER PRECAUTIONS

PREPARED BY  L.J. Durney, Technical Director DATE

June 1976

TRW-00628

0908-1994

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Frederick Gumm Chemical Company, Inc.
538 FOREST STREET, KEARNY, NEW JERSEY 07032

U.S. DEPARTMENT OF LABOR
WORKPLACE STANDARDS ADMINISTRATION
BUREAU OF LABOR STANDARDS
MATERIAL SAFETY DATA SHEET

717
FORM NO. OSHA-20 (MODIFIED)
MAY 1971

MDC CONTROL NO.

CAT 4317F

SECTION I: MATERIAL AND MANUFACTURER IDENTIFICATION

MANUFACTURER'S NAME Frederick Gumm Chemical Company, Inc.		EMERGENCY PHONE NO. 201-991-4142
ADDRESS (NUMBER, STREET, CITY, STATE AND ZIP CODE) 538 Forest Street Kearny, N.J. 07032		
CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS CLEPO: 824-R	
CHEMICAL FAMILY Mildly Alkaline Burnishing Compound	FORMULA	

SECTION II: HAZARDOUS INGREDIENTS*

PAINTS, PRESERVATIVES/SOLVENTS	%	TLV (UNITS)	ALLOYS AND METALLIC COATINGS	%	TLV (UNITS)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES*				%	TLV (UNITS)

SECTION III: PHYSICAL DATA

BOILING POINT (°F)		SPECIFIC GRAVITY (H ₂ O = 1)	
VAPOR PRESSURE (mm Hg.)		PERCENT VOLATILE BY VOLUME (%)	
VAPOR DENSITY (AIR = 1)		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER	Complete to 10 oz./gal.		
APPEARANCE AND ODOR	Free flowing powder		

SECTION IV: FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED)	None	FLAMMABLE LIMITS	LeL	UeL
		None		
EXTINGUISHING MEDIA				
FIRE FIGHTING PROCEDURES	None			
UNUSUAL FIRE AND EXPLOSION HAZARDS	None			

*PLEASE DO NOT USE GENERALIZATIONS, SUCH AS PETROLEUM HYDROCARBONS, ALCOHOL, KETONES.
USE SPECIFIC CHEMICAL NAMES, SUCH AS METHANOL, BENZENE, PERCHLOROETHYLENE.

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SECTION V: HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

EFFECTS OF OVEREXPOSURE

Mildly alkaline powder with detergent characteristics. Avoid contact with eyes. Continued or repeated exposure of unprotected skin can cause chapping.

EMERGENCY AND FIRST AID PROCEDURES

Flush thoroughly with water. For eyes get medical attention.

SECTION VI: REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

none

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII: SPILL OR LEAK PROCEDURES

BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Sweep up and/or flush away

WASTE DISPOSAL METHOD

Neutralize to acceptable pH and dump to drain. Local regulations may stipulate additional treatment.

SECTION VIII: SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (SPECIFY TYPE)

Not generally required

VENTILATION	LOCAL EXHAUST	Not generally required	SPECIAL
	MECHANICAL (GENERAL)		OTHER

PROTECTIVE GLOVES Rubber or neoprene

EYE PROTECTION Goggles

OTHER PROTECTIVE EQUIPMENT

SECTION IX: SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Keep dry

OTHER PRECAUTIONS

TRW-00630

PREPARED BY T. T. Dierney, Technical Director

May 1976

DATE

0908-1996

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MATERIAL SAFETY DATA SHEET JUN - 5 1992

SECTION 1 - IDENTIFICATION DATA

FREDERICK GUMM CHEMICAL COMPANY, INC.
538 Forest Street, Kearny, NJ 07032

Emergency Telephone Numbers:
8:00 AM - 5:00 PM EST (201) 991-4174
24 Hours (313) 614-5626

Effective Date: 01-31-90

D.O.T. HAZARD CLASS - Cleaning Compound N.O.S.
CHEMICAL FAMILY - Liquid Cleaner
CHEMICAL NAME/SYNONYMS - GLEPO 881-A
FORMULA - Mixture
MSDS REVIEWED BY - Keith Frey, V.P. Quality & Regulatory Affairs

SECTION 2 - PHYSICAL DATA

Boiling Point (deg F) - Over 212 degrees F
Vapor Pressure (mm Hg) - NA
Vapor Density (air=1) - NA
Solubility in Water - Complete
Specific Gravity (H2O=1) - 1.03
Volatiles by Volume - 78%
Evaporation Rate (H2O=1) - 1

Appearance & Odor: Yellowish liquid

SECTION 3 - FIRE AND EXPLOSION DATA

Flash Point - None

EXTINGUISHING MEDIA:

This product is not combustible. See SPECIAL FIRE FIGHTING PROCEDURES.

SPECIAL FIRE FIGHTING PROCEDURES:

Protective clothing and self-contained breathing apparatus should be worn by firefighters in areas where product is stored. Water spray, foam, dry chemical, or carbon dioxide may be used in areas where product is stored.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

None

NFPA HAZARD CLASSIFICATION:

Health (Blue) - 1
Flammability (Red) - 0
Reactivity (Yellow) - 0

4=Extreme
3=High
2=Moderate
1=Slight
0=Insignificant

DEGREE OF HAZARD

=====

SECTION 4 - REACTIVITY DATA

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STABILITY: Stable

CONDITIONS TO AVOID: NA

INCOMPATIBILITY:

Strong alkalis, strong oxidizers.

HAZARDOUS DECOMPOSITION PRODUCTS:

None expected.

HAZARDOUS POLYMERIZATION: Will not occur

CONDITIONS TO AVOID: NA

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SECTION 5 - HAZARDOUS COMPONENTS

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PAINTS, PRESERVATIVES, AND SOLVENTS:

NA

ALLOYS AND METALLIC COATINGS:

NA

HAZARDOUS COMPONENTS

	CAS NUMBER	TLV	PEL	LD50	%
&-Ethylene Glycol Monobutyl Ether	111-76-2	25	50	2500	1.00
Oxalic Acid	144-62-7	1	1	375	3.00
Dodecyl Benzene Sulfonic Acid	27176-87-0	NF	NF	NF	1.50

TLV = Mg/M3 - PEL = Mg/M3 - LD50 = oral, rat, Mg/Kg - NF = None Found

- The indicated material, if any, is listed as a carcinogen or potential carcinogen by one or more of the following: National Toxicology Program, I.A.R.C. Monographs, OSHA.

** - The indicated material, if any, does not have an established TLV, but does appear on one or more of the following states hazardous substance lists: Connecticut, Illinois, Michigan, Maine, Massachusetts, Minnesota, New Hampshire, New Jersey, New York, Oregon, Rhode Island, West Virginia, and Wisconsin, and is present in this product in amounts greater than 1%.

& - The indicated material, if any, is subject to the reporting requirements of SARA Title III, Section 313

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SECTION 6 - SPILL, LEAK, AND DISPOSAL PROCEDURES

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SPILL & LEAK PROCEDURES:

Liquids should be contained and adsorbed with a suitable adsorbent, or flushed to the waste treatment area. Flush area with plenty of water. Avoid all personal contact.

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INGESTION: NEVER give anything by mouth to an unconscious person. If vomiting occurs spontaneously, keep airway clear. Seek medical attention immediately.

INHALATION: Get person out of contaminated area to fresh air. If breathing has stopped, resuscitate and administer oxygen if readily available. Seek medical attention immediately.

SKIN: Immediately wash contaminated areas with plenty of water for 15 minutes. Remove contaminated clothing and footwear, and wash clothing before reuse. Discard any clothing that can not be decontaminated. Seek medical attention immediately.

EYES: IMMEDIATELY flush eyes with large amounts of water for at least 15 minutes, holding lids apart to ensure flushing of the entire surface. Washing eyes within 1 minute is essential to achieve maximum effectiveness. Seek medical attention immediately.

EMERGENCY AND FIRST AID PROCEDURES

CHRONIC: Repeated or prolonged exposure may cause dermatitis.

ACUTE: Irritating to all body tissues with which it comes in contact.

EFFECTS OF OVEREXPOSURE

INGESTION: This product, if swallowed, will be irritating to the mouth, throat, and stomach.

EYE CONTACT: This product is irritating to eye tissues on contact. May cause permanent eye damage.

SKIN ABSORPTION: See SKIN CONTACT above.

SKIN CONTACT: This product is irritating to tissues contacted and may cause skin damage.

INHALATION: Inhaling mist or spray is irritating to the upper respiratory tract and depending on the severity of exposure, may cause tissue damage.

ROUTES OF EXPOSURE

SECTION 7 - HEALTH HAZARD DATA

WASTE DISPOSAL METHODS:

Waste solution should not be discharged into sewers or streams. Solution should first be neutralized to a locally acceptable pH, and then well diluted with water. Depending on usage and locality, may also require precipitation and filtration of heavy metals. Otherwise, contact local waste disposal contractor.

SECTION 6 - SPILL, LEAK, AND DISPOSAL PROCEDURES continued

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SECTION 8 - SPECIAL HANDLING PROCEDURES

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RESPIRATORY: Respiration protection is not required under normal use.
Use NIOSH/MSHA approved respirator where mist or spray may be generated above the TLV limit.

VENTILATION: Use adequate local exhaust ventilation where mist or spray may be generated, to maintain level below the TLV limit.

GLOVES: Impervious gloves should be worn (ex. rubber or neoprene).

EYES: Chemical safety goggles and/or face shield.

OTHER: Chemically resistant shoes and apron. Safety showers and eyewash facilities should be accessible. All contaminated clothing should be washed with soap and water, and dried before reuse.

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SECTION 9 - SPECIAL PRECAUTIONS

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HANDLING AND STORAGE PRECAUTIONS::

Avoid contact with skin and eyes. Wash thoroughly after handling material.
Store in a cool, dry area, in a closed container when not being used.
DO NOT STORE with strong acids and oxidizers.

OTHER PRECAUTIONS:

Keep container tightly closed when not in use. Wash thoroughly after handling. Containers, even those that have been emptied, will retain product residue and vapors. Always obey hazard warnings and handle empty containers as if they were full. Containers must not be used for any other purpose.

The information herein is based on technical data that is believed to be reliable. It is intended for use by persons having technical skill and at their own discretion and risk. Since conditions of use are outside our control, we make no warranties, expressed or implied, and assume no liability in connection with the use of this information.

U.S. DEPARTMENT OF LABOR

Occupational Safety & Health Administration

MATERIAL SAFETY DATA SHEET

SECTION I	
MANUFACTURER'S NAME Frederick Gumm Chemical Co., Inc.	EMERGENCY TELEPHONE NO. 401 - 232-0606
ADDRESS (Number, Street, City, State, and ZIP Code) 20 Industrial Drive, Smithfield, RI 02917	
CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS CLEPO 885-P
CHEMICAL FAMILY Acid barrel and vibratory burnishing compound	

SECTION II HAZARDOUS INGREDIENTS					
PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV (Units)

SECTION III PHYSICAL DATA			
BOILING POINT (°F.)	212-215	SPECIFIC GRAVITY (H ₂ O = 1)	1.109
VAPOR PRESSURE (mm Hg.)		PERCENT VOLATILE BY VOLUME (%)	55
VAPOR DENSITY (AIR = 1)		EVAPORATION RATE (_____ = 1)	1
SOLUBILITY IN WATER	Soluble		
APPEARANCE AND ODOR Clear brownish liquid, mild odor			

SECTION IV FIRE AND EXPLOSION HAZARD DATA			
FLASH POINT (Method used)	None	FLAMMABLE LIMITS	<div style="display: flex; justify-content: space-between;"> LeI UeI </div>
EXTINGUISHING MEDIA			
SPECIAL FIRE FIGHTING PROCEDURES			
UNUSUAL FIRE AND EXPLOSION HAZARDS None			

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The data in this Material Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process.

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SECTION V HEALTH HAZARD DATA	
THRESHOLD LIMIT VALUE	33 mg/M ³ calc.
EFFECTS OF OVEREXPOSURE Mildly acidic compound containing surfactants, can cause irritation of eyes and continued or repeated skin contact may cause irritation and/or chapping.	
EMERGENCY AND FIRST AID PROCEDURES	
Skin - flush thoroughly with water.	
Eyes - flush thoroughly with water and get medical attention.	

SECTION VI REACTIVITY DATA			
STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	XX	
INCOMPATIBILITY (Materials to avoid)			
HAZARDOUS DECOMPOSITION PRODUCTS			
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	XX	

SECTION VII SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	
Flush to drain.	
WASTE DISPOSAL METHOD	
Neutralize to acceptable pH and dump to drain.	

SECTION VIII SPECIAL PROTECTION INFORMATION			
RESPIRATORY PROTECTION (Specify type) Not generally needed			
VENTILATION	LOCAL EXHAUST	SPECIAL	
	MECHANICAL (General)	OTHER Not generally needed	
PROTECTIVE GLOVES	Rubber or neoprene	EYE PROTECTION	Goggles
OTHER PROTECTIVE EQUIPMENT Depending on local conditions, rubber or neoprene apron and/or boots may be indicated.			

SECTION IX SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING	
Keep from freezing.	
OTHER PRECAUTIONS	

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0908-2002

MATERIAL SAFETY DATA SHEET JUN - 5 1992

SECTION 1 - IDENTIFICATION DATA

FREDERICK GUMM CHEMICAL COMPANY, INC.
538 Forest Street, Kearny, NJ 07032

Emergency Telephone Numbers:
8:00 AM - 5:00 PM EST
(201) 991-1171
24 Hrs: (313) 611-5626

CLEPO 992-N

D.O.T. HAZARD CLASS - Non-DOT Regulated
CHEMICAL FAMILY - Nickel Brightener
CHEMICAL NAME/SYNONYMS - CLEPO 992-N
FORMULA - Mixture
MSDS REVIEWED BY - Keith Frey, V.P. Quality & Regulatory Affairs

Effective Date:
11-31-90

SECTION 2 - PHYSICAL DATA

BOILING POINT (deg F) - Over 212 deg F
VAPOR PRESSURE (mm Hg) - NA
VAPOR DENSITY (air=1) - NA
SOLUBILITY IN WATER - Complete
SPECIFIC GRAVITY (H2O=1) - 1.10
VOLATILE BY VOLUME - 85%
EVAPORATION RATE (H2O=1) - <1

APPEARANCE & ODOR:

Clear liquid with no odor

SECTION 3 - FIRE AND EXPLOSION DATA

FLASH POINT - None

EXTINGUISHING MEDIA:

This product is not combustible.

SPECIAL FIRE FIGHTING PROCEDURES:

Protective clothing and self-contained breathing apparatus should be worn by firefighters in areas where product is stored. Water spray, foam, dry chemical, or carbon dioxide may be used in areas where product is stored.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

None

NFPA HAZARD CLASSIFICATION:

Health (Blue) - 1
Flammability (Red) - 0
Reactivity (Yellow) - 0

DEGREE OF HAZARD

4=Extreme
3=High
2=Moderate
1=Slight
0=Insignificant

SECTION 4 - REACTIVITY DATA

STABILITY: Stable

CONDITIONS TO AVOID: NA

INCOMPATIBILITY:
Strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS:
None expected

HAZARDOUS POLYMERIZATION: Will not occur
CONDITIONS TO AVOID: NA

SECTION 5 - HAZARDOUS COMPONENTS

PAINTS, PRESERVATIVES, AND SOLVENTS:
NA
ALLOYS AND METALLIC COATINGS:
NA

HAZARDOUS COMPONENTS	CAS NUMBER	TLV PPM	PEL PPM	LD50 PPM	%
#-Saccharin	81-07-2	NA	NA	NA	12.5

TLV = MG/M3 - PEL = MG/M3 - LD50 = oral, rat, MG/KG - NP = None Found

- The indicated material, if any, is listed as a carcinogen or potential carcinogen by one or more of the following: National Toxicology Program, I.A.R.C. Monographs, OSHA.

** - The indicated material, if any, does not have an established TLV, but does appear on one or more of the following states hazardous substance lists: Connecticut, Illinois, Michigan, Maine, Massachusetts, Minnesota, New Hampshire, New Jersey, New York, Oregon, Rhode Island, West Virginia, and Wisconsin, and is present in this product in amounts greater than 1%.

& - The indicated material, if any, is subject to the reporting requirements of SARA Title III, Section 313

SECTION 6 - SPILL, LEAK, AND DISPOSAL PROCEDURES

SPILL & LEAK PROCEDURES:

Liquids should be contained and adsorbed with a suitable adsorbent, or flushed to the waste treatment area. Flush area with plenty of water. Avoid all personal contact.

WASTE DISPOSAL METHODS:

Waste solution should not be discharged into sewers or streams. Solution should first be neutralized to a locally acceptable pH, and then well diluted with water. Depending on usage and locality, may also require precipitation and filtration of heavy metals. Otherwise, contact local

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SECTION 6 - SPILL, LEAK, AND DISPOSAL PROCEDURES continued

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waste disposal contractor.

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SECTION 7 - HEALTH HAZARD DATA

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ROUTES OF EXPOSURE

INHALATION: Inhaling mist or spray is irritating to the upper respiratory tract and depending on the severity of exposure, may cause tissue damage. May also cause a decrease in alertness.

SKIN CONTACT: This product is irritating to tissues contacted and may cause skin damage.

SKIN ABSORPTION: See SKIN CONTACT above.

EYE CONTACT: This product is irritating to eye tissues on contact. May cause permanent eye damage.

INGESTION: This product, if swallowed, will be irritating to the mouth, throat, and stomach.

EFFECTS OF OVEREXPOSURE

ACUTE: Irritating to all body tissues with which it comes in contact.

CHRONIC: Repeated or prolonged exposure may cause dermatitis.

EMERGENCY AND FIRST AID PROCEDURES

EYES: IMMEDIATELY flush eyes with large amounts of water for at least 15 minutes, holding lids apart to ensure flushing of the entire surface. Washing eyes within 1 minute is essential to achieve maximum effectiveness. Seek medical attention immediately.

SKIN: Immediately wash contaminated areas with plenty of water for 15 minutes. Remove contaminated clothing and footwear, and wash clothing before reuse. Discard any clothing that can not be decontaminated. Seek medical attention immediately.

INHALATION: Get person out of contaminated area to fresh air. If breathing has stopped, resuscitate and administer oxygen if readily available. Seek medical attention immediately.

INGESTION: NEVER give anything by mouth to an unconscious person. If swallowed, do not induce vomiting. Give large quantities of water. If vomiting occurs spontaneously, keep airway clear. Seek medical attention immediately.

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SECTION 8 - SPECIAL HANDLING PROCEDURES

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RESPIRATORY: Respiration protection is not required under normal use.
Use NIOSH/MSHA approved respirator where mist or spray may be generated
above the TLV limit.

VENTILATION: Use adequate local exhaust ventilation where mist or spray
may be generated, to maintain level below the TLV limit.

GLOVES: Impervious gloves should be worn (ex. rubber or neoprene).

EYES: Chemical safety goggles and/or face shield.

OTHER: Chemically resistant shoes and apron. Safety showers and eyewash
facilities should be accessible. All contaminated clothing should be
washed with soap and water, and dried before reuse.

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SECTION 9 - SPECIAL PRECAUTIONS

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HANDLING AND STORAGE PRECAUTIONS::

Avoid contact with skin and eyes. Wash thoroughly after handling material.
Store in a cool, dry area, in a closed container when not being used.
DO NOT STORE with oxidizers.

OTHER PRECAUTIONS:

Keep container tightly closed when not in use. Wash thoroughly after
handling. Containers, even those that have been emptied, will retain
product residue and vapors. Always obey hazard warnings and handle empty
containers as if they were full. Containers must not be used for any other
purpose.

The information herein is based on technical data that is believed to be
reliable. It is intended for use by persons having technical skill and
at their own discretion and risk. Since conditions of use are outside
our control, we make no warranties, expressed or implied, and assume no
liability in connection with the use of this information.

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MATERIAL SAFETY DATA SHEET

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SECTION 1 - IDENTIFICATION DATA

ENVIRONMENTAL SAFETY

FREDERICK GUMM CHEMICAL COMPANY, INC.
538 Forest Street, Kearny, NJ 07032

Emergency Telephone Numbers:
8:00 AM - 5:00 PM EST
(201) 991-4174
24 Hrs: (313) 644-5626

CLEPO BLACK WAX

D.O.T. HAZARD CLASS	- Chemical NOS	Effective Date:
CHEMICAL FAMILY	- WATER WAX EMULSION	06-11-87
CHEMICAL NAME/SYNONYMS	- CLEPO BLACK WAX	
FORMULA	- Mixture	
MSDS REVIEWED BY	- Peter K. Dietrich, V.P. Quality & Regulatory Affairs	

SECTION 2 - PHYSICAL DATA

BOILING POINT (Deg F)	- >212 deg F
VAPOR PRESSURE (mm Hg)	- NA
VAPOR DENSITY (air=1)	- NA
SOLUBILITY IN WATER	- Complete
SPECIFIC GRAVITY (H2O=1)	- Apprx. .99
VOLATILE BY VOLUME	- NA
EVAPORATION RATE (H2O=1)	- >1

APPEARANCE & ODOR:
BLACK LIQUID WITH NO ODER

SECTION 3 - FIRE AND EXPLOSION DATA

FLASH POINT - None

EXTINGUISHING MEDIA:

This product is not combustible.

SPECIAL FIRE FIGHTING PROCEDURES:

Protective clothing and self-contained breathing apparatus should be worn by firefighters in areas where product is stored. Water spray, foam, dry chemical, or carbon dioxide may be used in areas where product is stored.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

None

NFPA HAZARD CLASSIFICATION:

DEGREE OF HAZARD

Health	(Blue)	- 1
Flammability	(Red)	- 0
Reactivity	(Yellow)	- 0

4=Extreme
3=High
2=Moderate
1=Slight
0=Insignificant

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SECTION 7 - HEALTH HAZARD DATA

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ROUTES OF EXPOSURE

INHALATION: Inhaling mist or spray is irritating to the upper respiratory tract and depending on the severity of exposure, may cause tissue damage. May also cause a decrease in alertness.

SKIN CONTACT: This product is irritating to tissues contacted and may cause skin damage.

SKIN ABSORPTION: See SKIN CONTACT above.

EYE CONTACT: This product is irritating to eye tissues on contact. May cause permanent eye damage.

INGESTION: This product, if swallowed, will be irritating to the mouth, throat, and stomach.

EFFECTS OF OVEREXPOSURE

ACUTE: Irritating to all body tissues with which it comes in contact.

CHRONIC: Repeated or prolonged exposure may cause dermatitis.

EMERGENCY AND FIRST AID PROCEDURES

EYES: IMMEDIATELY flush eyes with large amounts of water for at least 15 minutes, holding lids apart to ensure flushing of the entire surface. Washing eyes within 1 minute is essential to achieve maximum effectiveness. Seek medical attention immediately.

SKIN: Immediately wash contaminated areas with plenty of water for 15 minutes. Remove contaminated clothing and footwear, and wash clothing before reuse. Discard any clothing that can not be decontaminated. Seek medical attention immediately.

INHALATION: Get person out of contaminated area to fresh air. If breathing has stopped, resuscitate and administer oxygen if readily available. Seek medical attention immediately.

INGESTION: NEVER give anything by mouth to an unconscious person. If swallowed, do not induce vomiting. Give large quantities of water. If vomiting occurs spontaneously, keep airway clear. Seek medical attention immediately.

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SECTION 8 - SPECIAL HANDLING PROCEDURES

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RESPIRATORY: Respiration protection is not required under normal use. Use NIOSH/MSHA approved respirator where mist or spray may be generated above the TLV limit.

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SECTION 4 - REACTIVITY DATA

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STABILITY: Stable
CONDITIONS TO AVOID: NA

INCOMPATIBILITY:
NA

HAZARDOUS DECOMPOSITION PRODUCTS:
None expected

HAZARDOUS POLYMERIZATION: Will not occur
CONDITIONS TO AVOID: NA

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SECTION 5 - HAZARDOUS COMPONENTS

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PAINTS, PRESERVATIVES, AND SOLVENTS:

NA

ALLOYS AND METALLIC COATINGS:

NA

HAZARDOUS COMPONENTS
NONE

CAS NUMBER TLV PEL LD50 % W/W

TLV = Mg/M3 - PEL = Mg/M3 - LD50 = oral, rat, Mg/Kg - NF = None Found

- The indicated material, if any, is listed as a carcinogen or potential carcinogen by one or more of the following: National Toxicology Program, I.A.R.C. Monographs, OSHA.

** - The indicated material, if any, does not have an established TLV, but does appear on one or more of the following states hazardous substance lists: Connecticut, Illinois, Michigan, Maine, Massachusetts, Minnesota, New Hampshire, New Jersey, New York, Oregon, Rhode Island, West Virginia, and Wisconsin, and is present in this product in amounts greater than 1%.

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SECTION 6 - SPILL, LEAK, AND DISPOSAL PROCEDURES

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SPILL & LEAK PROCEDURES:

Liquids should be contained and adsorbed with a suitable adsorbent, or flushed to the waste treatment area. Flush area with plenty of water. Avoid all personal contact.

WASTE DISPOSAL METHODS:

Waste solution should not be discharged into sewers or streams. Solution should first be neutralized to a locally acceptable pH, and then well diluted with water. Depending on usage and locality, may also require precipitation and filtration of heavy metals. Otherwise, contact local waste disposal contractor.

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SECTION 8 - SPECIAL HANDLING PROCEDURES continued

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VENTILATION: Use adequate local exhaust ventilation where mist or spray may be generated, to maintain level below the TLV limit.

GLOVES: Impervious gloves should be worn (ex. rubber or neoprene).

EYES: Chemical safety goggles and/or face shield.

OTHER: Chemically resistant shoes and apron. Safety showers and eyewash facilities should be accessible. All contaminated clothing should be washed with soap and water, and dried before reuse.

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SECTION 9 - SPECIAL PRECAUTIONS

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HANDLING AND STORAGE PRECAUTIONS::

Avoid contact with skin and eyes. Wash thoroughly after handling material. Store in a cool, dry area, in a closed container when not being used. DO NOT STORE with strong acids & oxidizers, chlorinated organic compounds.

OTHER PRECAUTIONS:

Keep container tightly closed when not in use. Wash thoroughly after handling. Containers, even those that have been emptied, will retain product residue and vapors. Always obey hazard warnings and handle empty containers as if they were full. Containers must not be used for any other purpose.

The information herein is based on technical data that is believed to be reliable. It is intended for use by persons having technical skill and at their own discretion and risk. Since conditions of use are outside our control, we make no warranties, expressed or implied, and assume no liability in connection with the use of this information.

JUN - 5 1992

MATERIAL SAFETY DATA SHEET

SECTION 1 - IDENTIFICATION DATA

FREDERICK GUNN CHEMICAL COMPANY, INC.

500 Forest Street, Redway, NJ 07082

Emergency Telephone Number:
8:00 AM - 5:00 PM EST

(201) 991-1171

24 Hrs: (818) 011-5020

CLEPO TRW NICKEL WETTER

D.O.T. HAZARD CLASS - Chemical NOS

Effective Date:
12-18-90

CHEMICAL FAMILY - Nickel Brightener

CHEMICAL NAME/SYNONYMS - CLEPO TRW NICKEL WETTER

FORMULA - Mixture

MSDS REVIEWED BY - Keith Frey, V.P. Quality & Regulatory Affairs

SECTION 2 - PHYSICAL DATA

BOILING POINT (deg F) - Over 212 deg F

VAPOR PRESSURE (mm Hg) - NA

VAPOR DENSITY (air=1) - NA

SOLUBILITY IN WATER - Complete

SPECIFIC GRAVITY (H2O=1) - 1.05

VOLATILE BY VOLUME - 90%

EVAPORATION RATE (H2O=1) - <1

APPEARANCE & ODOR:

WATER WHITE

SECTION 3 - FIRE AND EXPLOSION DATA

FLASH POINT - None

EXTINGUISHING MEDIA:

This product is not combustible.

SPECIAL FIRE FIGHTING PROCEDURES:

Protective clothing and self-contained breathing apparatus should be worn by firefighters in areas where product is stored. Water spray, foam, dry chemical, or carbon dioxide may be used in areas where product is stored.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

None

NFPA HAZARD CLASSIFICATION:

Health (Blue) - 1
Flammability (Red) - 0
Reactivity (Yellow) - 0

DEGREE OF HAZARD

4=Extreme
3=High
2=Moderate
1=Slight
0=Insignificant

SECTION 4 - REACTIVITY DATA

STABILITY: Stable

CONDITIONS TO AVOID: NA

INCOMPATIBILITY:

Strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS:

None expected

HAZARDOUS POLYMERIZATION: Will not occur

CONDITIONS TO AVOID: NA

SECTION 5 - HAZARDOUS COMPONENTS

PAINTS, PRESERVATIVES, AND SOLVENTS:

NA

ALLOYS AND METALLIC COATINGS:

NA

HAZARDOUS COMPONENTS

#-Formaldehyde

CAS NUMBER

50-00-0

TLV

2

PEL

NP

LD50

36

%

0.02

TLV = Mg/M3 - PEL = Mg/M3 - LD50 = oral, rat, Mg/Kg - NP = None Found

- The indicated material, if any, is listed as a carcinogen or potential carcinogen by one or more of the following: National Toxicology Program, I.A.R.C. Monographs, OSHA.

** - The indicated material, if any, does not have an established TLV, but does appear on one or more of the following states hazardous substance lists: Connecticut, Illinois, Michigan, Maine, Massachusetts, Minnesota, New Hampshire, New Jersey, New York, Oregon, Rhode Island, West Virginia, and Wisconsin, and is present in this product in amounts greater than 1%.

& - The indicated material, if any, is subject to the reporting requirements of SARA Title III, Section 313

SECTION 6 - SPILL, LEAK, AND DISPOSAL PROCEDURES

SPILL & LEAK PROCEDURES:

Liquids should be contained and adsorbed with a suitable adsorbent, or flushed to the waste treatment area. Flush area with plenty of water. Avoid all personal contact.

WASTE DISPOSAL METHODS:

Waste solution should not be discharged into sewers or streams. Solution should first be neutralized to a locally acceptable pH, and then well diluted with water. Depending on usage and locality, may also require precipitation and filtration of heavy metals. Otherwise, contact local

TRW-00646

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INHALATION: Get person out of contaminated area to fresh air. If breathing has stopped, resuscitate and administer oxygen if readily available. Seek medical attention immediately.

INGESTION: NEVER give anything by mouth to an unconscious person. If swallowed, do not induce vomiting. Give large quantities of water. If vomiting occurs spontaneously, keep airway clear. Seek medical attention immediately.

SKIN: Immediately wash contaminated areas with plenty of water for 15 minutes. Remove contaminated clothing and footwear, and wash clothing before reuse. Discard any clothing that can not be decontaminated. Seek medical attention immediately.

EYES: IMMEDIATELY flush eyes with large amounts of water for at least 15 minutes, holding lids apart to ensure flushing of the entire surface. Washing eyes within 1 minute is essential to achieve maximum effectiveness. Seek medical attention immediately.

EMERGENCY AND FIRST AID PROCEDURES

CHRONIC: Repeated or prolonged exposure may cause dermatitis.

ACUTE: Irritating to all body tissues with which it comes in contact.

EFFECTS OF OVEREXPOSURE

INGESTION: This product, if swallowed, will be irritating to the mouth, throat, and stomach.

EYE CONTACT: This product is irritating to eye tissues on contact. May cause permanent eye damage.

SKIN ABSORPTION: See SKIN CONTACT above.

SKIN CONTACT: This product is irritating to tissues contacted and may cause skin damage.

INHALATION: Inhaling mist or spray is irritating to the upper respiratory tract and depending on the severity of exposure, may cause tissue damage. May also cause a decrease in alertness.

ROUTES OF EXPOSURE

SECTION 7 - HEALTH HAZARD DATA

Waste disposal contractor.

SECTION 6 - SPILL, LEAK, AND DISPOSAL PROCEDURES continued

=====

SECTION 8 - SPECIAL HANDLING PROCEDURES

=====

RESPIRATORY: Respiration protection is not required under normal use.
Use NIOSH/MSHA approved respirator where mist or spray may be generated above the TLV limit.

VENTILATION: Use adequate local exhaust ventilation where mist or spray may be generated, to maintain level below the TLV limit.

GLOVES: Impervious gloves should be worn (ex. rubber or neoprene).

EYES: Chemical safety goggles and/or face shield.

OTHER: Chemically resistant shoes and apron. Safety showers and eyewash facilities should be accessible. All contaminated clothing should be washed with soap and water, and dried before reuse.

=====

SECTION 9 - SPECIAL PRECAUTIONS

=====

HANDLING AND STORAGE PRECAUTIONS::

Avoid contact with skin and eyes. Wash thoroughly after handling material. Store in a cool, dry area, in a closed container when not being used.
DO NOT STORE with strong acids & oxidizers, chlorinated organic compounds.

OTHER PRECAUTIONS:

Keep container tightly closed when not in use. Wash thoroughly after handling. Containers, even those that have been emptied, will retain product residue and vapors. Always obey hazard warnings and handle empty containers as if they were full. Containers must not be used for any other purpose.

TRW-00648

The information herein is based on technical data that is believed to be reliable. It is intended for use by persons having technical skill and at their own discretion and risk. Since conditions of use are outside our control, we make no warranties, expressed or implied, and assume no liability in connection with the use of this information.

MATERIAL SAFETY DATA SHEET

SECTION 1 - IDENTIFICATION DATA

FREDERICK GUMM CHEMICAL COMPANY, INC.
338 Forest Street, Kearny, NJ 07032

Emergency Telephone Numbers:
8:00 AM - 5:00 PM EST
(201) 221-4174
24 Hrs: (313) 644-5626

CLEPOX C ACTIVATOR

D.O.T. HAZARD CLASS - OXIDIZER, corrosive solid, n.o.s. Effective Date:
CHEMICAL FAMILY - Black oxide for copper/copr alloys 6-22-87
CHEMICAL NAME/SYNONYMS - CLEPOX C ACTIVATOR
FORMULA - Mixture
MSDS REVIEWED BY - Peter K. Dietrich, V.P. Quality & Regulatory Affairs

SECTION 2 - PHYSICAL DATA

BOILING POINT (Deg F) - NA
VAPOR PRESSURE (mm Hg) - NA
VAPOR DENSITY (air=1) - NA
SOLUBILITY IN WATER - Complete to 32 oz/gal
SPECIFIC GRAVITY (H₂O=1) - NA
VOLATILE BY VOLUME - NA
EVAPORATION RATE (H₂O=1) - NA

APPEARANCE & ODOR:
White powder

SECTION 3 - FIRE AND EXPLOSION DATA

FLASH POINT - None

EXTINGUISHING MEDIA:

Carbon dioxide, water spray, foam or dry chemical.

SPECIAL FIRE FIGHTING PROCEDURES:

In areas where product is stored: Firefighters should wear protective clothing and self-contained breathing apparatus. Product will supply fire with oxygen, suffocating type extinguishers are of little value.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

Emits highly toxic and corrosive fumes under fire conditions.

NFPA HAZARD CLASSIFICATION:

Health (Blue) - 3
Flammability (Red) - 1
Reactivity (Yellow) - 2

DEGREE OF HAZARD

4-Extreme
3-High
2-Moderate
1-Slight
0-Insignificant

=====

SECTION 4 - REACTIVITY DATA

=====

STABILITY: Unstable

CONDITIONS TO AVOID: Forms explosive mixtures with organic or oxidizable compounds.

INCOMPATIBILITY:

Strong acids, flammable liquids, certain metals, organic material, organic halogenated compounds, reducing agents.

HAZARDOUS DECOMPOSITION PRODUCTS:

None found

HAZARDOUS POLYMERIZATION: Will not occur

CONDITIONS TO AVOID: NA

=====

SECTION 5 - HAZARDOUS COMPONENTS

=====

PAINTS, PRESERVATIVES, AND SOLVENTS:

NA

ALLOYS AND METALLIC COATINGS:

NA

HAZARDOUS COMPONENTS

Sodium Hydroxide (Caustic Soda)
Sodium Chlorite

CAS NUMBER

1310-73-2
7758-19-2

TLV

C 2
NF

PEL

2
NF

LD50

270
140

% W/W

50.0
**

TLV = mg/m³ - PEL = mg/m³ - LD50 = oral, rat, mg/kg - NF = None Found

- The indicated material, if any, is listed as a carcinogen or potential carcinogen by one or more of the following: National Toxicology Program, I.A.R.C. Monographs, OSHA.

** - The indicated material, if any, does not have an established TLV, but does appear on one or more of the following states hazardous substance lists: Connecticut, Illinois, Michigan, Maine, Massachusetts, Minnesota, New Hampshire, New Jersey, New York, Oregon, Rhode Island, West Virginia, and Wisconsin, and is present in this product in amounts greater than 1%.

=====

SECTION 6 - SPILL, LEAK, AND DISPOSAL PROCEDURES

=====

SPILL & LEAK PROCEDURES:

Spilled material may be shoveled up, and stored in closed containers for possible normal use or proper disposal. Flush area with plenty of water. Dilute acid may be used to neutralize final traces immediately after flushing.

WASTE DISPOSAL METHODS:

Caustic waste solution should not be discharged into sewers or streams. Caustic should first be neutralized with dilute acid to a locally acceptable pH, and then well diluted with water. Depending on usage and locality, may also require precipitation and filtration of heavy metals. Otherwise, contact local waste disposal contractor.

=====

SECTION 7 - HEALTH HAZARD DATA

=====

ROUTES OF EXPOSURE

INHALATION: Airborne concentrations of dust, mist, or spray of this product may cause damage to the upper respiratory tract and even to the lung tissue which could produce chemical pneumonia depending upon severity of exposure.

SKIN CONTACT: This product is destructive to tissue contacted and produces severe burns.

SKIN ABSORPTION: See SKIN CONTACT above.

EYE CONTACT: This product is destructive to eye tissues on contact. Will cause severe burns that result in damage to the eyes and even blindness.

INGESTION: This product, if swallowed, can cause severe burns and complete tissue perforation of mucous membranes of the mouth, throat, esophagus, and stomach.

EFFECTS OF OVEREXPOSURE

ACUTE: Corrosive to all body tissues with which it comes in contact.

CHRONIC: Local effect may consist of multiple areas of destruction of the skin or of primary irritant dermatitis. Similarly, inhalation of dust, spray, or mist may result in varying degrees of irritation or damage to the respiratory tract tissues, general depression, and cyanosis.

EMERGENCY AND FIRST AID PROCEDURES

EYES: IMMEDIATELY flush eyes with large amounts of water for at least 15 minutes, holding lids apart to ensure flushing of the entire surface. Washing eyes within 1 minute is essential to achieve maximum effectiveness. Seek medical attention immediately.

SKIN: Immediately wash contaminated areas with plenty of water for 15 minutes. Remove contaminated clothing and footwear, and wash clothing before reuse. Discard any clothing that can not be decontaminated. Seek medical attention immediately.

INHALATION: Get person out of contaminated area to fresh air. If breathing has stopped, resuscitate and administer oxygen if readily available. Seek medical attention immediately.

INGESTION: NEVER give anything by mouth to an unconscious person. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. If available, give several glasses of milk. If vomiting occurs spontaneously, keep airway clear. Seek medical attention immediately.

TRW-00651

=====

SECTION 8 - SPECIAL HANDLING PROCEDURES

=====

RESPIRATORY: Respiration protection is not required under normal use. Use NIOSH/MSHA approved respirator where dust, mist, or spray may be generated above TLV limit.

VENTILATION: Use adequate local exhaust ventilation where dust, mist, or spray may be generated, to maintain level below TLV limit.

GLOVES: Impervious gloves should be worn (ex. rubber or neoprene).

EYES: Chemical safety goggles and or Face shield.

OTHER: Chemically resistant shoes and apron. Safety showers and eyewash facilities should be accessible. All contaminated clothing should be washed with soap and water, and dried before reuse.

=====

SECTION 9 - SPECIAL PRECAUTIONS

=====

HANDLING AND STORAGE PRECAUTIONS::

Avoid contact with strong acids, flammable liquids, organic materials, reducing agents, and cyanides. May react with tin, zinc, magnesium, and aluminum, generating hydrogen gas which is explosive.

FOR POWDERS:

1. To prepare solutions, this material dissolves with the liberation of much heat. Add material slowly with constant stirring, to avoid violent spattering.
2. Store in a cool, dry area, in a closed container.

OTHER PRECAUTIONS:

Keep container tightly closed when not in use. Wash thoroughly after handling. Containers, even those that have been emptied, will retain product residue and vapors. Always obey hazard warnings and handle empty containers as if they were full. Container must not be used for any other purpose.

The information herein is based on technical data that is believed to be reliable. It is intended for use by persons having technical skill and at their own discretion and risk. Since conditions of use are outside our control, we make no warranties, expressed or implied, and assume no liability in connection with the use of this information.

MATERIAL SAFETY DATA SHEET

712

SECTION 1 - IDENTIFICATION DATA

FREDERICK GUMM CHEMICAL COMPANY, INC.
539 Torrance Street, Kearny, NJ 07032

Emergency Telephone Numbers:
8:00 AM - 5:00 PM EST
(201) 991-4174
24 Hrs: (313) 644-5626

CLEPOX C BRASS ACTIVATOR

PRODUCT HAZARD CLASS - OXIDIZER, corrosive solid, n.o.s. Effective Date:
CHEMICAL FAMILY - Black oxide for copper/copr alloys 02-01-90
CHEMICAL NAME (SYNONYMS) - CLEPOX C BRASS ACTIVATOR
FORMULA - Mixture
MODE REVIEWED BY - Keith Frey, V.P. Quality & Regulatory Affairs

SECTION 2 - PHYSICAL DATA

BOILING POINT (20°g TO) - NA
VAPOR PRESSURE (mm Hg) - NA
VAPOR DENSITY (air=1) - NA
SOLUBILITY IN WATER - Complete to 32 oz/gal
SPECIFIC GRAVITY (H2O=1) - NA
VOLATILE BY VOLUME - NA
EVAPORATION RATE (H2O=1) - NA

APPEARANCE & ODOR:
white powder

SECTION 3 - FIRE AND EXPLOSION DATA

FLASH POINT - None

EXTINGUISHING MEDIA:

Carbon dioxide, water spray, foam or dry chemical.

SPECIAL FIRE FIGHTING PROCEDURES:

In areas where product is stored: Firefighters should wear protective clothing and self-contained breathing apparatus. Product will supply fire with oxygen, suffocating type extinguishers are of little value.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

Emits highly toxic and corrosive fumes under fire conditions.

NFPA HAZARD CLASSIFICATION:

Health (Blue) - 3
Flammability (Red) - 1
Reactivity (Yellow) - 2

DEGREE OF HAZARD

4=Extreme
3=High
2=Moderate
1=Slight
0=Insignificant

TRW-00653

=====

SECTION 4 - REACTIVITY DATA

=====

STABILITY: Unstable

CONDITIONS TO AVOID: Forms explosive mixtures with organic or oxidizable compounds.

INCOMPATIBILITY:

Flammable solids, flammable liquids, certain metals, organic material, organic chlorinated compounds, reducing agents.

HAZARDOUS DECOMPOSITION PRODUCTS:

None found

HAZARDOUS POLYMERIZATION: Will not occur

CONDITIONS TO AVOID: NA

=====

SECTION 5 - HAZARDOUS COMPONENTS

=====

PAINTS, PRESERVATIVES, AND SOLVENTS:

NA

ALLOYS AND METALLIC COATINGS:

NA

HAZARDOUS COMPONENTS

Sodium Hydroxide (Caustic Soda)
Sodium Chlorite

CAS NUMBER

1310-73-2
7758-19-2

TLV

C 2
NF

PEL

2
NF

LD50

240
140

%

90.0
10.0

TLV = Mg/M3 - PEL = Mg/M3 - LD50 = oral, rat, Mg/Kg - NF = None Found

- The indicated material, if any, is listed as a carcinogen or potential carcinogen by one or more of the following: National Toxicology Program, I.A.R.C. Monographs, OSHA.

** - The indicated material, if any, does not have an established TLV, but does appear on one or more of the following states hazardous substance lists: Connecticut, Illinois, Michigan, Maine, Massachusetts, Minnesota, New Hampshire, New Jersey, New York, Oregon, Rhode Island, West Virginia, and Wisconsin, and is present in this product in amounts greater than 1%.

& - The indicated material, if any, is subject to the reporting requirements of SARA Title III, Section 313

=====

SECTION 6 - SPILL, LEAK, AND DISPOSAL PROCEDURES

=====

SPILL & LEAK PROCEDURES:

Spilled material may be shoveled up, and stored in closed containers for possible normal use or proper disposal. Flush area with plenty of water. Dilute acid may be used to neutralize final traces immediately after flushing.

TRW-00654

=====

SECTION 6 - SPILL, LEAK, AND DISPOSAL PROCEDURES continued

=====

WASTE DISPOSAL METHODS:

Caustic waste solution should not be discharged into sewers or streams. Solution should first be neutralized with dilute acid to a locally acceptable pH, and then well diluted with water. Depending on usage and quantity, may also require precipitation and filtering of heavy metals. Otherwise, contact local waste disposal contractor.

=====

SECTION 7 - HEALTH HAZARD DATA

=====

ROUTES OF EXPOSURE

INHALATION: Airborne concentrations of dust, mist, or spray of this product may cause damage to the upper respiratory tract and even to the lung tissue which could produce chemical pneumonia depending upon severity of exposure.

SKIN CONTACT: This product is destructive to tissue contacted and produces severe burns.

SKIN ABSORPTION: See SKIN CONTACT above.

EYE CONTACT: This product is destructive to eye tissues on contact. Will cause severe burns that result in damage to the eyes and even blindness.

INGESTION: This product, if swallowed, can cause severe burns and complete tissue perforation of mucous membranes of the mouth, throat, esophagus, and stomach.

EFFECTS OF OVEREXPOSURE

ACUTE: Corrosive to all body tissues with which it comes in contact.

CHRONIC: Local effect may consist of multiple areas of destruction of the skin or of primary irritant dermatitis. Similarly, inhalation of dust, spray, or mist may result in varying degrees of irritation or damage to the respiratory tract tissues, general depression, and cyanosis.

EMERGENCY AND FIRST AID PROCEDURES

EYES: IMMEDIATELY flush eyes with large amounts of water for at least 15 minutes, holding lids apart to ensure flushing of the entire surface. Washing eyes within 1 minute is essential to achieve maximum effectiveness. Seek medical attention immediately.

SKIN: Immediately wash contaminated areas with plenty of water for 15 minutes. Remove contaminated clothing and footwear, and wash clothing before reuse. Discard any clothing that can not be decontaminated. Seek medical attention immediately.

INHALATION: Get person out of contaminated area to fresh air. If breathing has stopped, resuscitate and administer oxygen if readily available. Seek medical attention immediately.

TRW-00655

=====

SECTION 7 - HEALTH HAZARD DATA continued

=====

INGESTION: NEVER give anything by mouth to an unconscious person. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. If available, give several glasses of milk. If vomiting occurs spontaneously, keep airway clear. Seek medical attention immediately.

=====

SECTION 8 - SPECIAL HANDLING PROCEDURES

=====

RESPIRATORY: Respiration protection is not required under normal use. Use NIOSH/MSHA approved respirator where dust, mist, or spray may be generated above TLV limit.

VENTILATION: Use adequate local exhaust ventilation where dust, mist, or spray may be generated, to maintain level below TLV limit.

GLOVES: Impervious gloves should be worn (ex. rubber or neoprene).

EYES: Chemical safety goggles and or face shield.

OTHER: Chemically resistant shoes and apron. Safety showers and eyewash facilities should be accessible. All contaminated clothing should be washed with soap and water, and dried before reuse.

=====

SECTION 9 - SPECIAL PRECAUTIONS

=====

HANDLING AND STORAGE PRECAUTIONS::

Avoid contact with strong acids, flammable liquids, organic materials, reducing agents, and cyanides. May react with tin, zinc, magnesium, and aluminum, generating hydrogen gas which is explosive.

FOR POWDERS:

1. To prepare solutions, this material dissolves with the liberation of much heat. Add material slowly with constant stirring, to avoid violent splattering.
2. Store in a cool, dry area, in a closed container.

OTHER PRECAUTIONS:

Keep container tightly closed when not in use. Wash thoroughly after handling. Containers, even those that have been emptied, will retain product residue and vapors. Always obey hazard warnings and handle empty containers as if they were full. Container must not be used for any other purpose.

TRW-00656

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COBRA KUT

Cobra Kut oils are used primarily for all machining operations on copper and brass. They contain non-staining extreme pressure agents that will not stain the workpiece.

Cobra Kut 100 and 200 contain the same level of non-staining, sulfur and fat. The only difference is their viscosity. Cobra Kut 150 has the addition of chlorine for additional load carrying capacity.

Cobra Kut can also be used on mild to medium duty cutting, on free machining steels, and therefore are excellent where both ferrous and non ferrous metals are used alternately in one machine.

Typical Specifications

	Cobra Kut 100	Cobra Kut 150	Cobra Kut 200
Viscosity @ 100 °F	100	150	200
Color	Dark	Dark	Dark
Pour °F	-30	-30	-25
Flash COC °F	300	315	325
Sulfur (Non Staining)%	.6	.6	.6
Chlorine	-	.8	-
Fat	9.6	9.6	9.6

Don

*PROPOSED LUBRICANTS TO
REPLACE KEROSENE FLARD OIL.
OK BY DEQIE?*

Jon Anderson

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Revised
OSHA No. 44-R-1387

MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing,
Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME LUBRX PRODUCTS INC.		EMERGENCY TELEPHONE NO. 617 699 2000
ADDRESS (Number, Street, City, State, and ZIP Code) 342 EAST WASHINGTON ST., NO. ATTLEBORO, MASS. 02760		
CHEMICAL NAME AND SYNONYMS		TRADE NAME AND SYNONYMS
CHEMICAL FAMILY PETROLEUM HYDROCARBON	FORMULA COMPLEX MIXTURE OF HYDROCARBONS	

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV (Units)
PETROLEUM GAS (NO. 2 - 05-0)				10	1000 mg/m ³

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	NOT DETERMINED	SPECIFIC GRAVITY (H ₂ O=1)	.90
VAPOR PRESSURE (mm Hg.)	NOT DETERMINED	PERCENT. VOLATILE BY VOLUME (%)	NIL
VAPOR DENSITY (AIR=1)	NOT DETERMINED	EVAPORATION RATE (_____=1)	NIL
SOLUBILITY IN WATER	NIL		
APPEARANCE AND ODOR	DARK AMBER -- PETROLEUM ODOR		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	395 °F COC	FLAMMABLE LIMITS	Lel	Uel
		NOT DETERMINED		
EXTINGUISHING MEDIA WATER FOG, DRY CHEMICAL, FOAM, CO2				
SPECIAL FIRE FIGHTING PROCEDURES SELF CONTAINED BREATHING APPARATUS IN CONFINED AREAS. AVOID BREATHING VAPOR AND FUMES.				
UNUSUAL FIRE AND EXPLOSION HAZARDS NONE				

TRW-00658

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

5 mg/m³ for oil mist in air

EFFECTS OF OVEREXPOSURE

PROLONGED OR REPEATED SKIN CONTACT MAY CAUSE SKIN IRRITATION

EMERGENCY AND FIRST AID PROCEDURES

IN CASE OF SKIN CONTACT, WASH THOROUGHLY WITH SOAP AND WATER - IN CASE OF

EYE CONTACT, FLUSH IMMEDIATELY WITH WATER UNTIL IRRITATION SUBSIDES - IF

SWALLOWED, CALL A PHYSICIAN

SECTION VI - REACTIVITY DATA

STABILITY

UNSTABLE

CONDITIONS TO AVOID

STABLE

X

INCOMPATIBILITY (Materials to avoid)

INCOMPATIBLE WITH STRONG OXIDIZERS

HAZARDOUS DECOMPOSITION PRODUCTS

THERMAL DECOMPOSITION MAY CAUSE OXIDES OF CARBON

HAZARDOUS

POLYMERIZATION

MAY OCCUR

CONDITIONS TO AVOID

WILL NOT OCCUR

X

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

RECOVER FREE LIQUID - USE OIL ABSORBANT MATERIAL - KEEP OUT OF SEWERS AND

WATER COURSES - ADVISE AUTHORITIES IF PRODUCT HAS ENTERED OR MAY ENTER SEWERS,

WATER COURSES, OR EXTENDED LAND AREAS.

WASTE DISPOSAL METHOD

ASSURE CONFORMITY WITH FEDERAL, STATE, AND LOCAL REGULATIONS.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)

NONE REQUIRED

VENTILATION

LOCAL EXHAUST USE LOCAL EXHAUST TO

CAPTURE VAPORS AND FUMES

MECHANICAL (General)

SPECIAL

60 FPM AIR VELOCITY IN CLOSED AREAS

OTHER

PROTECTIVE GLOVES USE CHEMICALLY TREATED

EYE PROTECTION

USE SPLASH GOGGLES IF EYE

GLOVES IF NEEDED TO AVOID PROLONGED CONTACT

CONTACT MAY OCCUR

OTHER PROTECTIVE EQUIPMENT

NONE NEEDED

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

DO NOT HANDLE OR STORE NEAR HEAT, SPARKS, OR STRONG OXIDANTS.

OTHER PRECAUTIONS

AVOID BREATHING OIL MIST. AVOID EYE CONTACT AND REPEATED OR PROLONGED SKIN

CONTACT.

PAGE (2)

CP7364-OF

PREPARED BY: ARMAND A. AUDET

Form OSHA-20

Rev. May 72

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TRW-00659

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0908-2026

TRW-00660



OCEAN® Network
EMERGENCY PHONE 1-800-OLIN-911

MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS CoBron® Iron Modified Brass		
CHEMICAL FAMILY Copper	FORMULA Mixture	TRADE NAME Alloy 664
DESCRIPTION Metallic		CAS NO. Not assigned/mixture

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Precautions needed for abrasive, melting or other operations generating a dust or fume. Do not get dust or fume in eyes, on skin or on clothing. Do not take internally. Wash thoroughly with soap and water before eating or smoking. Avoid breathing dust or fumes.	
PROTECTIVE EQUIPMENT Eyes Goggles Gloves Impervious Other NIOSH/MSHA approved high efficiency particulate respirator if excessive dusting/fumes occur	VENTILATION REQUIREMENTS Local exhaust or general ventilation required as dictated by airborne concentrations.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL		OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper	Dust 1 mg/m ³ Fume 0.1 mg/m ³		TD _{LO} 120 ug/kg (human)	No data	Metal fume fever, respirator irritation
Zinc	Fume 5 mg/m ³		No data	TC _{LO} 124 mg/m ³ /50 (min) human	Metal fume fever
Iron	Fume 10 mg/m ³		No data	No data	Accumulation of dust in lung (siderosis)

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD Not Applicable	OSHA CLASSIFICATION Non-combustible	FLAMMABLE EXPLOSIVE LIMITS	LOWER N/A	UPPER N/A
EXTINGUISHING MEDIA <u>Non-combustible - choose extinguishing media suitable for surrounding materials.</u>				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved self-contained breathing apparatus where this material is involved in a fire.				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE None established for mixture. (Copper 1 mg/m ³ , Zinc 5 mg/m ³ , Iron 5 mg/m ³ ACGIH 1985-86).	
SYMPTOMS OF OVER EXPOSURE Dust and fume - sneezing, congestion, metallic taste, nausea, chills, fever.	
EMERGENCY FIRST-AID PROCEDURES SKIN Dust or fume: Wash with soap and water before eating or smoking. If an irritation develops, call a physician.	
EYES Dust or fume: Flush thoroughly with water for 15 minutes, call a physician	
INGESTION Dust: Not a likely route of exposure. If ingested, call a physician.	
INHALATION Dust or fume: Remove victim to fresh air. Call a physician.	

Chemical

CAS No.

0908-2027

TRW-00661

CHEMICAL NAME Alloy 664

SECTION VI - TOXICOLOGY (Product)

ACUTE ORAL LD 50		CARCINOGENICITY	Not known to be carcinogenic
ACUTE ORAL TD _{LO}	Copper 120 mg/kg (human)	MUTAGENICITY	Not known to be mutagenic
ACUTE DERMAL LD 50	No data	EYE IRRITATION	Dust is irritant
ACUTE INHALATION LC 50	No data	PRIMARY SKIN IRRITATION	Dust may be an irritant
PRINCIPAL ROUTES OF ABSORPTION			
Inhalation of dust or fume			
EFFECTS OF ACUTE EXPOSURE			
Dust or fume: metal fume fever, respirator irritation			
EFFECTS OF CHRONIC EXPOSURE			
Chronic over-exposure may cause kidney and liver effects.			

SECTION VII - SPILL AND LEAKAGE PROCEDURES (Control Procedures)

ACTION FOR MATERIAL RELEASE OR SPILL

Dust or fume - Wear NIOSH/MSHA approved high efficiency particulate respirator. Follow OSHA regulations for respirator use. (See 29 CFR 1910.134). Wear goggles, coveralls, impervious gloves and boots. Shovel or sweep up and place in an appropriate container. Wash all contaminated clothing before reuse.

In the event of a large spill, use the emergency telephone number shown on the front of this sheet.

TRANSPORTATION EMERGENCY, CONTACT CHEMTREC 800-424-9300

WASTE DISPOSAL METHOD

Dispose of contaminated product and materials used in cleaning up spills or leaks in a manner approved for this material. Consult appropriate federal, state and local regulatory agencies to ascertain proper disposal procedures.

SECTION VIII - SHIPPING DATA

D.O.T. CLASS Not regulated

SECTION IX - REACTIVITY DATA

STABLE	X UNSTABLE	AT	°C	°F	HAZARDOUS POLYMERIZATION	MAY OCCUR
						WILL NOT OCCUR X
CONDITIONS TO AVOID		Presence of carbon monoxide during melting				
INCOMPATIBILITY (Material to Avoid)		Dust and fume - acetylene, chlorine				
HAZARDOUS DECOMPOSITION PRODUCTS		Copper fume, zinc oxide fume, iron oxide fume				

SECTION X - PHYSICAL DATA

MELTING POINT	1895°F	VAPOR PRESSURE	N/A	VOLATILES	N/A
BOILING POINT	No data	SOLUBILITY IN WATER	Insoluble	EVAPORATION RATE	N/A
SPECIFIC GRAVITY (H ₂ O = 1)	*	pH	N/A	VAPOR DENSITY (Air = 1)	N/A
*DENSITY	.317 pounds/in ³				

INFORMATION FURNISHED BY: Environmental Hygiene and Toxicology Department DATE April 7, 1986

TRW-00662

Department of Environmental Hygiene and Toxicology

1056

olin CORPORATION
120 Long Ridge Road, Stamford, Connecticut 06907
OCEAN® Network
EMERGENCY PHONE 1-800-OLIN-911

0908-2028

Material Safety Data Sheet
May be used to comply with
OSHA's Hazard Communication Standard,
29 CFR 1910.1200. Standard must be
consulted for specific requirements.

U.S. Department of Labor
Occupational Safety and Health Administration
(Non-Mandatory Form)
Form Approved
OMB No. 1218-0072



IDENTITY (As Used on Label and List) **COLD COAT**

Note: Blank spaces are not permitted. If any item is not applicable, or no information is available, the space must be marked to indicate that.

Section I

Manufacturer's Name SPECTROWAX	Emergency Telephone Number
Address (Number, Street, City, State, and ZIP Code) 70 HICBORN STREET	Telephone Number for Information 254-2800
BRIGHTON, MA 02135	Date Prepared MAY 1986
	Signature of Preparer (optional)

Section II — Hazardous Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity; Common Name(s))	OSHA PEL	ACGIH TLV	Other Limits Recommended	% (optional)
DIETHYLENE GLYCOL MONOMETHYL ETHER	NONE	ESTABLISHED		5
CAS# 111-77-3				

Section III — Physical/Chemical Characteristics

Boiling Point	212F	Specific Gravity (H ₂ O = 1)	1.02
Vapor Pressure (mm Hg.)	WATER	Melting Point	
Vapor Density (AIR = 1)	WATER	Evaporation Rate (Butyl Acetate = 1)	WATER
Solubility in Water	COMPLETE		
Appearance and Odor	MILKY BROWN SOLUTION; MILD ODOR		

Section IV — Fire and Explosion Hazard Data

Flash Point (Method Used)	NONE	Flammable Limits	N/A	LEL	UEL
Extinguishing Media	N/A				
Special Fire Fighting Procedures	N/A				
Unusual Fire and Explosion Hazards	N/A				

0908-2029

Reproduce locally

OSHA 174, Sept. 1985

TRW-00663

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Stability	Unstable		Conditions to Avoid	N/A
	Stable	X		
Incompatibility (Materials to Avoid) N/A				
Hazardous Decomposition or Byproducts N/A				
Hazardous Polymerization	May Occur		Conditions to Avoid	N/A
	Will Not Occur	X		

Section VI — Health Hazard Data

Route(s) of Entry:	Inhalation?	NO	Skin?	NO	Ingestion?	NO
Health Hazards (Acute and Chronic) N/A						

Carcinogenicity:	NTP?	NO	IARC Monographs?	NO	OSHA Regulated?	NO
------------------	------	----	------------------	----	-----------------	----

Signs and Symptoms of Exposure	N/A
--------------------------------	-----

Medical Conditions Generally Aggravated by Exposure	N/A
---	-----

Emergency and First Aid Procedures
EYES- FLUSH WITH LARGE AMOUNTS OF WATER, SEEK MEDICAL ASSISTANCE. SKIN- WASH WELL WITH SOAP AND WATER. IF INGESTED-INDUCE VOMMITING, SEEK IMMEDIATE MEDICAL ATTENTION.

Section VII — Precautions for Safe Handling and Use

Steps to Be Taken in Case Material Is Released or Spilled	FLUSH WITH WATER, MOP UP AND HOLD FOR DISPOSAL.
---	---

Waste Disposal Method	ANY METHOD IN ACCORDANCE WITH APPLICABLE LAWS.
-----------------------	--

Precautions to Be Taken in Handling and Storing	KEEP CONTAINER CLOSED WHEN NOT IN USE. DO NOT STORE AT ELEVATED TEMPERATURES FOR EXTENDED PERIODS OF TIME.
---	--

Other Precautions	GLOVES AND EYE PROTECTION RECOMMENDED
-------------------	---------------------------------------

Section VIII — Control Measures

Respiratory Protection (Specify Type)	N/A
---------------------------------------	-----

Ventilation	Local Exhaust	N/A	Special
	Mechanical (General)		Other

Protective Gloves	RECOMMENDED	Eye Protection	RECOMMENDED
-------------------	-------------	----------------	-------------

Other Protective Clothing or Equipment	N/A
--	-----

Work/Hygiene Practices	N/A
------------------------	-----

WIRE PROCESSING — SPECIALIZING IN
SUPERIOR COLD HEADING QUALITY WIRE
6440 E. CANNING ST., COMMERCE, CALIF. 90040
(213) 722-4933 (800) MGF-WIRE TELEX: 181444

Material Safety Data Sheet
O.S.H.A. Safety and Health Standards
(29 C.F.R. 1900.1200 Rev. July 1, 1984)

Section I -- Material Identity

MANUFACTURERS NAME & ADDRESS

MGF Industries Corp.
6440 E. Canning Street
Commerce, California 90040

AREA CODE & PHONE NO.

(213) 722-4933

NAME & TITLE OF INDIVIDUAL SUPPLYING INFORMATION

R.W. Johnson - Manager, Quality Control

PRODUCT NAME/TRADE NAME

Cold Drawn Carbon and Alloy Steel - Bars and wire Coil

CHEMICAL NAME & SYNONYMS

Alloy Steel Products - Example 8740

Section II - Ingredients & Residual Substances

*C.A.S. NO.	ELEMENTS	WEIGHT PERCENTAGE	PERMISSIBLE EXPOSURE LIMITS	
			Contaminant	Units/Air Volume
1309-37-1	BASE METAL Iron	94.0 - 99.5	Iron Oxide Fumes	10mg/M ³
	ALLOYS			
7440-44-0	Carbon	.01 - .50	Carbon Oxide	55mg/M ³
7439-96-5	Manganese	.25 - 1.70	Manganese	5mg/M ³
7723-14-0	Phosphorus	.001- .040	Phosphorous (Yellow)	.1mg/M ³
7704-34-9	Sulfur	.001- .13	Sulfur dioxide	13mg/M ³
7740-21-3	Silicon	.01 - .35	N/A	10mg/M ³
7740-02-0	Nickel	.01 - 2.00	Nickel	1mg/M ³
7740-47-3	Chromium	.01 - 1.10	Soluble Chromic/ Chromous Salts	.5mg/M ³
			Chrome & Insoluble Salts	1mg/M ³

0908-2031

TRW-00665

WIRE PROCESSING — SPECIALIZING IN
 SUPERIOR COLD HEADING QUALITY WIRE
 6440 E. CANNING ST., COMMERCE, CALIF. 90040
 (213) 722-4933 (800) MGF-WIRE TELEX: 181444

Material Safety Data Sheet
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*C.A.S. NO.	ELEMENTS	% WGT	PERMISSIBLE EXPOSURE LIMITS	UNITS
7439-98-7	ALLOYS Molybdenum	.01 -.65	Soluble Moly. Components	5mg/M ³
7440-6-22	Vanadium	.01 -.35	Insoluble Moly. Components Vanadium Pentoxide Dust Fume	15mg/M ³ 5mg/M ³ 5mg/M ³
1303-86-2	Boron	.0001-.003	Boron Oxide	10mg/M ³
7429-90-5	Aluminum	.01 -.20	Aluminum Oxide	10mg/M ³
7440-70-2	Calcium	<.005-	Calcium Oxide	5mg/M ³
7782-447	Oxygen	<.005	N/A	N/A
7727-379	Nitrogen	.005-.016	N/A	N/A
7440-50-8	Copper	.01 -.35	Fume	.2mg/M ³
13463-67-7	Titanium	<.005	Titanium Dioxide	10mg/M ³
7440-67-2	Zirconium	<.005	N/A	5mg/M ³
7440-66-6	Zinc	<.005	Zinc Oxide	5mg/M ³
7440-31-5	Tin	<.005	Tin Oxide	10mg/M ³
743-99-54	Magnesium	<.005	Magnesium Oxide	10mg/M ³
7440-33-7	Tungsten	<.005		1mg/M ³
7440-43-9	Cadmium	<.005	Cadmium Oxide	

All carbon and alloy steel products consist primarily of iron, but may include elements added intentionally which are present as residuals in low concentrations of less than .5 percent. The above mentioned elements may appear and vary in percentage weight depending on steel grade or according to order specification.

COATINGS

Surface coatings of petroleum oils, phosphate or dry lube (borax or lime) may be used as a rust inhibitor or lubricant.

*Chemical Abstract Society

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 Page 4

Molybdenum - Slight irritation of eyes, nose and throat.

Vanadium - Irritation to conjunctivae and respiratory tract (greenish-black discoloration of tongue and shortness of breath).

Chronic

Iron (Iron-oxide) - Pulmonary effects, siderosis

Manganese - Bronchitis, pneumonitis, inflammation and/or ulceration of upper respiratory tract, and possible cancer of nasal passages and lungs.

Chromium - (Same as nickel)

Molybdenum - Pain in joints, hands, knees and feet

Vanadium - No reported cases of chronic effects due to overexposure to vanadium.

Emergency First Aid

Remove to fresh air, administer oxygen and seek medical attention.

Skin

Effects of Overexposure

Prolonged skin contact may cause reddening and drying of skin or possibly dermatitis from nickel/chromium content and/or surface coating such as oil, phosphate, lime, etc.

Emergency First Aid

Wash effected areas with soap and water and seek medical attention immediately.

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Section VI - Reactivity Data

Stability - Stable - Yes
Unstable - No

Incompatibility (Materials to avoid)- Acids

Hazardous Products of Decomposition:

Metal Fumes: Iron oxide, chromium, nickel, lead, manganese, molybdenum, vanadium pentoxide, zinc oxides and other noxious gases may be produced during welding and buring operations.

Section VII - Spill or Leak Procedures

Steps to be taken in case material is released or spilled-
N/A.
Waste Disposal - N/A.

Section VII - Special Protection Information

Respiratory Protection - N.I.O.S.H. approved dust/mist/fume respirator if O.S.H.A. permissible exposure limits are exceeded (Ref. Section II) and proper ventilation is not possible.

Other Protective Equipment - (ie., safety shoes, protective clothing, gloves, eye protection, ventilation requirements). Dependent upon processing of products, e.g. welding, grinding, burnging, cutting, brazing, etc. Consult various local, state and federal codes, standards, and guidelines, e.g. OSHA, ANSI, ASTM, AWS, etc.

Section IX - Special Precautions

Handling, Storage - The proper protective equipment should be used in handling and storage (See Section VII - Special Protection).

Welding and Cutting - Adequate ventilation and/or approved respiratory protection should be provided if permissible exposure limits are exceeded.

For additonal information, see the American National Standard Safety in Welding and Cutting 249.1-1967 (American Welding Society Publication 249.1-1967).

RECEIVED

JAN 24 1992

CHEM-TREND INCORPORATED
1445 W. McPherson Park Dr.
P.O. Box 860
Howell, Michigan 48844-0860
Telephone (517) 546-4520
Telex: 229 455

January 16, 1992

SAFETY AND HEALTH DIRECTOR
TRW FASTENERS
265 3RD STREET
CAMBRIDGE, MASSACHUSETTS 02142
ATTN: RICHARD RUSSELL

In compliance with the OSHA Hazard Communication Standard,
29 CFR 1910.1200, the attached Material Safety Data Sheet(s)
is/are being provided to you for the following product(s):

COME-CLEAN 900 (MSDS# 2149.8)

Our Material Safety Data Sheet(s) has/have been developed to
meet the requirements of the OSHA Hazard Communication
Standard.

If you have any questions regarding the Material Safety Data
Sheet(s), please feel free to contact me at (517) 546-4520.

Very truly yours,

CHEM-TREND INCORPORATED

ANN FARMER

Regulatory Affairs Manager

Attachment(s)

TRW-00670

0908-2036

CHEM-TREND INCORPORATED
MATERIAL SAFETY DATA SHEET
EMERGENCY TELEPHONE NO. 517-546-4520

SECTION I

PRODUCT NAME OR NUMBER: COME-CLEAN 900

MANUFACTURER'S NAME: CHEM-TREND INCORPORATED

ADDRESS: 1445 McPherson Park Dr., P.O. Box 860, Howell, MI 48844-0860

PROPER SHIPPING NAME(49 CFR 172.101): Not regulated

HAZARD CLASS(49 CFR 172.101): Not regulated

HAZARD ID NUMBER: Not applicable

CHEMICAL FAMILY: Alkaline water base solution

SECTION II INGREDIENTS

Blend of surfactants, couplers,
builders, dyes, conditioners
and water

95-99%

Sodium hydroxide

1-5% TLV*: 2mg/m³ (ceiling) (OSHA & ACGIH)

*TLV means Threshold Limit Value. " This refers to airborne concentrations of substances and represent conditions under which it is believed that nearly all workers may be repeatedly exposed day after day without adverse effect."

SECTION III TYPICAL PHYSICAL DATA NOT TO BE CONSIDERED SPECIFICATIONS

BOILING POINT (initial):	approx. water
SPECIFIC GRAVITY:	1.2
VAPOR PRESSURE (mm Hg):	approx. water
VAPOR DENSITY (air=1):	approx. water
EVAPORATION RATE (ether=1):	approx. 1
PERCENT VOLATILE BY WEIGHT:	65-75
SOLUBILITY IN WATER:	Complete
pH:	Concentrate - 12.5-13.0 5% dilution - 11.9-12.3
APPEARANCE AND ODOR:	Clear pale yellow-green liquid; mild odor

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (method used): None

FLAMMABLE LIMITS IN AIR, % BY VOLUME: Lower(lcl) Upper(uel)
Not applicable

EXTINGUISHING MEDIA: Fire and heat may drive off water leaving chemical ingredients which may burn.

SPECIAL FIRE FIGHTING PROCEDURES: Wear self-contained breathing apparatus when fire fighting in a confined space.

UNUSUAL FIRE AND EXPLOSION HAZARDS: None known

CONTAINER HANDLING: Do not cut or weld empty drums unless they are thoroughly cleaned.

MSDS NUMBER 2149.8
REVISED 02/06/91

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0908-2037

SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: Not established for the product. See section II.

LISTED CARCINOGEN (NTP, IARC OR OSHA): This product does not contain any listed carcinogens.

ROUTES OF EXPOSURE AND ACUTE EFFECTS:

DANGER: CORROSIVE

Skin Contact: The concentrate will irritate or burn skin after short contact due to high alkalinity. Dilutions of 1% in water alone have alkalinity similar to hand soap, although the product is not intended for use as hand soap.

Eye Contact: Concentrate will irritate or burn eye tissue. Dilutions will be irritating.

Inhalation: The concentrate is not volatile, so no inhalation should be possible.

Ingestion: Concentrate will be harmful if swallowed, because of its alkalinity. It will irritate or burn mucous membrane tissue.

CHRONIC EFFECTS: A review of literature suggests no long term hazard. Because of the intermittent nature of use of the product, exposure is very limited.

EMERGENCY AND FIRST AID PROCEDURES:

Skin Contact: Concentrate - wash off with plain water. Dilution - wash with soap and water. Launder contacted clothing before reuse.

Eye Contact: Flush with water for at least 15 minutes. Contact physician.

Inhalation: If throat is irritated by vapors, move to fresh air.

Ingestion: If concentrate is swallowed, DO NOT induce vomiting. Give large quantities of water. Contact physician immediately. Never give anything by mouth to an unconscious person.

SECTION VI REACTIVITY DATA

STABILITY: Stable

CONDITIONS TO AVOID: Contact with strong acids; contact of concentrate with active metal fines such as aluminum.

INCOMPATIBILITY: Store away from strong oxidizers.

HAZARDOUS DECOMPOSITION PRODUCTS: Hydrocarbon decomposition products at elevated temperatures.

HAZARDOUS POLYMERIZATION: Will not occur

CONDITIONS TO AVOID: None known

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:

Small Spills: Soak up with absorbent material.

Large Spills: Dike area to prevent runoff, recover liquid, soak up remaining liquid with absorbent material

WASTE DISPOSAL METHOD: Dispose of in accordance with local, state and federal regulations

RCRA HAZARDOUS WASTE DESIGNATION: This product does fall under current EPA RCRA definitions of hazardous waste with designation D002 because of its alkalinity if the product is disposed of in its original form.

CERCLA (Superfund) REPORTABLE QUANTITY: This product does contain a CERCLA regulated material, sodium hydroxide, RQ=1000 LBS.

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION: Good industrial hygiene practices recommend that engineering controls (such as local and/or mechanical ventilation) be used to reduce environmental concentrations to the permissible exposure level. Respirators may be used when engineering and work practice controls are not technically feasible, when such controls are in the process of being installed, or when they fail and need to be supplemented. If the use of a respirator is necessary use only a MSHA/NIOSH approved air supplied respirator or an air-purifying respirator.

PROTECTIVE GLOVES: Impervious gloves (such as rubber, neoprene, NBR nitrile, polyethylene) when handling the concentrate.

EYE PROTECTION: Safety glasses with side shields or chemical goggles

OTHER PROTECTIVE EQUIPMENT: Appropriate clothing to avoid skin contact

MSDS NUMBER 2149.8

CHEM-TREND INCORPORATED

REVISED 02/06/91

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TRW-00672

0908-2038

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Keep drums and containers of concentrate closed when not in use. Allow to warm to room temperature before dilution.

Do not add any other additive ingredients to the concentrate.

Do not use aluminum, magnesium, or zinc equipment with this product in the concentrated form.

OTHER PRECAUTIONS: None known

SECTION X OTHER HAZARD INFORMATION

The product is not considered corrosive according to D.O.T. regulations.

SECTION XI ADDITIONAL REGULATORY INFORMATION

OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA)

29 CFR 1910.1200 Hazardous Chemical: Yes

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (SARA)

Section 302, Extremely Hazardous Substance: No

Section 311, Hazardous Chemical: Yes

Hazard categories: Fire - No, Reactivity - No, Sudden release of pressure - No, Immediate - Yes, Delayed - No

Section 313, Toxic chemical: Yes - sodium hydroxide 1310-73-2 1-5%

TOXIC SUBSTANCE CONTROL ACT (TSCA)

TSCA Inventory: This product is a mixture and is not listed in the TSCA Inventory. The individual ingredients in the product are listed in the Inventory.

APPROVAL: MHB

DISCLAIMER

Information presented herein has been compiled from information provided to us by our suppliers and other sources considered to be dependable and is accurate and reliable to the best of our knowledge and belief but is not guaranteed to be so. Nothing herein is to be construed as recommending any practice or the use of any product in violation of any patent or in violation of any law or regulation. It is the users' responsibility to determine the suitability of any material for a specific purpose and to adopt such safety precautions as may be necessary. We make no warranty as to the results to be obtained in using any material and, since conditions of use are not under our control, we must necessarily disclaim all liability with respect to the use of any material supplied by us.

MSDS NUMBER 2149.8

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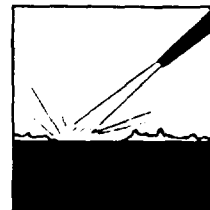
TRW-00673

0908-2039

COME-CLEAN 900

heavy-duty industrial cleaner

CLEANER



Description

COME-CLEAN 900 (formerly COME CLEAN) is a heavy-duty, water-base liquid industrial cleaner that efficiently and economically removes industrial soils from metal substrates, concrete floors and other surfaces.

COME-CLEAN 900 provides excellent cleaning performance at various dilutions and its versatility enables users to consolidate the number of cleaners used in a plant. COME-CLEAN 900 contains no petroleum or chlorinated solvents, abrasives, or phosphates.

A letter designation may appear following COME-CLEAN 900. This indicates a custom-blended product. Information on this data sheet applies to all versions of COME-CLEAN 900.

Benefits

- Non-flammable
- Contains non-nitrited rust inhibitor package
- Effective on a wide variety of substrates and soils
- Concentrated formula allows for economical-use dilutions
- Excellent rinsability
- Works in a wide variety of water temperatures
- Easily diluted and mixed
- USDA approved for cleaning utensils and equipment

Applications

COME-CLEAN 900 is especially effective in steam cleaning equipment, but it can also be used in soak tank systems, manual operations (mop, brush, hand sprayer, etc.) and industrial scrubbers. In addition, COME-CLEAN 900 is recommended for the flushing and cleaning of machine tools prior to charging with new coolant.

Dilutions

OPERATION	DILUTION
Steam cleaning	8 - 10% (by volume)
Soak tank cleaning	10 - 12% (by volume)
Manual cleaning (mop, brush, etc.)	1 - 5% (by volume)
Industrial scrubber	5 - 8% (by volume)
Machine tool sumps	3 - 5% (by volume)

(OVER)

TRW-00674



1445 W. McPherson Park Drive • P.O. Box 860 • Howell, MI 48844-0860
Telephone (517) 546-4520 • Toll Free Number: 800-248-4056 • Michigan Toll Free 800-292-8236

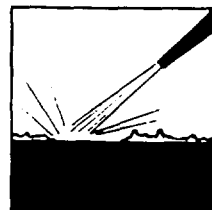
Look for newer and better things from Chem-Trend, where constant research brings you tomorrow's products... today.

0908-2040

COME-CLEAN 900

heavy-duty industrial cleaner

CLEANER



Typical Properties

Appearance
Odor
Density (lbs/gal; kg/l)
pH (5% dilution)
Solubility in water
Flash point
Freezing point

Clear, pale yellow liquid
Detergent
9.2; 1.10
11.8 - 12.3
Complete
None
30°F

Handling

Do not use aluminum, magnesium or zinc equipment for handling or storing this product.

Avoid concentrate contact with skin, eyes and clothing. Wear goggles and protective clothing. In case of contact, immediately flush skin and/or eyes with abundance of water. Consult physician for eye contact.

This material is not classified as toxic by oral administration. Toxicity tests were conducted in accordance with techniques specified in the Regulations for the Enforcement of the Federal Hazardous Substance Act (16 CFR 1500).

We believe COME-CLEAN 900 has a low degree of hazard when used as intended. For complete information on health and safety hazards, request a copy of Chem-Trend's Material Safety Data Sheet.

Foremost consideration is given to environmental and worker safety in the formulation of all Chem-Trend products.

Packaging

COME-CLEAN 900 is available in 1-gallon cans, 5-gallon pails, 55-gallon drums and bulk quantities.

Data may vary slightly due to minor formulation changes.

For further information on special applications or other Chem-Trend products, write or call your Chem-Trend distributor or representative.

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1007



TRW-00675



1445 W. McPherson Park Drive • P.O. Box 860 • Howell, MI 48844-0860
Telephone (517) 546-4520 • Toll Free Number: 800-248-4056 • Michigan Toll Free 800-292-8236

Look for newer and better things from Chem-Trend, where constant research brings you tomorrow's products...today.

0908-2041

MATERIAL SAFETY DATA SHEET

SECTION I NAME AND PRODUCT

MANUFACTURER'S NAME: General Electric Co. Specialty Materials Department ADDRESS (STREET, CITY, STATE AND ZIP CODE): 6325 Huntley Road Worthington, Ohio 43085 U.S.A.	CONTACT: P. D. St. Pierre EMERGENCY TELEPHONE NO. (614) 438-2205 APPROVED BY <i>[Signature]</i> DATE 11-12-85
TRADE NAME, COMMON NAME OR SPECIFICATION: COMPAX * tool blanks, sintered polycrystalline diamond on a cemented tungsten carbide substrate with cobalt binder; COMPAX die blanks	
CHEMICAL FAMILY OR PRODUCT TYPE: Abrasive tool or die blanks	

SECTION II COMPOSITION

CHEMICAL NAME	COMMON NAME	REG ^m (Y/N)	CAS #	OSHA PERMISSIVE EXPOSURE LIMIT	ACGIH TLV	CARCIN- OGEN ^m (Y/N)
Carbon (C)	Diamond	N	---	---	---	N
Tungsten carbide (limits for tungsten dust)		N	---	---	5 mg/cu M	N
Cobalt (Co)		Y	---	0.1 mg/cu M	1.1 mg/cu M	N

Materials are regulated by OSHA 29 CFR 1910.1200 Hazard Communication Standard.

SECTION III PHYSICAL AND CHEMICAL DATA

BOILING POINT: N/A	MELTING POINT: N/A	SPECIFIC GRAVITY: N/A
VAPOR PRESSURE: N/A	PERCENT VOLATILE BY VOL.: Not Volatile	VAPOR DENSITY: N/A
EVAPORATION RATE: N/A	SOLUBILITY IN WATER: Insoluble	SOLUBILITY IN ALCOHOL: Insoluble
SOLUBILITY IN OTHER SOLVENT: Tungsten carbide		
APPEARANCE AND ODOR: soluble in strong acid		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: NAIF	(METHOD USED) N/A	FLAMMABLE LIMITS: LEL: N/A UEL: N/A
EXTINGUISHING MEDIA: NAIF		
SPECIAL FIRE FIGHTING PROCEDURES: None		
EXPLOSION POTENTIAL: None		

SECTION V HEALTH, FIRST AID AND MEDICAL DATA

PRIMARY ROUTE(S) OF ENTRY	ACUTE AND CHRONIC HEALTH EFFECTS AND EFFECTS OF OVEREXPOSURE	FIRST AID AND MEDICAL INFORMATION
INHALATION:	Dust from grinding can cause nose and throat irritation. Potential for causing transient or permanent respiratory disease (probably from cobalt dust).	Remove from exposure; seek medical attention.
INGESTION:	No information available for ingestion that may have occurred in the tungsten carbide industry. It has been suggested that cobalt has the potential for causing blood, heart and organ problems.	If substantial quantities are ingested, dilute with a large amount of water, induce vomiting; seek medical attention.
SKIN CONTACT & ABSORPTION	Can cause irritation or allergic skin rash due to cobalt sensitization.	Wash with soap and water; seek medical attention.
EYE:	Can cause irritation.	Flush eyes with water; seek medical attention.
OTHER POTENTIAL HEALTH RISKS:	NAIF	

* Trademark of General Electric Co., U.S.A.

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SECTION VI CORROSIVITY AND REACTIVITY DATA

STABILITY: UNSTABLE () STABLE (X) POLYMERIZATION: MAY OCCUR () WILL NOT OCCUR (X)
 INCOMPATIBILITY (MATERIALS TO AVOID):

DECOMPOSITION PRODUCTS: NAIF

CONDITIONS TO BE AVOIDED:

SECTION VII STORAGE, HANDLING AND USE PROCEDURES

NORMAL STORAGE AND HANDLING: Handle with adequate ventilation for nuisance dust. See OSHA 29CFR 1910.94 (Ventilation) and 29CFR 1910.1000 (Air Contaminants).

NORMAL USE: Handle with adequate ventilation for nuisance dust. See OSHA 29CFR 1910.94 (Ventilation) and 29CFR 1910.1000 (Air Contaminants).

STEPS TO BE TAKEN IN CASE OF LEAKS OR SPILLS: Sweep up and dispose inert solid.

WASTE DISPOSAL METHOD: Normal cleanup procedures.

SECTION VIII PERSONAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (SPECIFY TYPE):

VENTILATION	LOCAL: Yes
Yes	MECHANICAL: Yes
	(GENERAL)
	OTHER: None

PROTECTIVE GLOVES: Protective gloves are recommended when contact with dust or mist is likely.

EYE PROTECTION: When operating grinding, cutting or drilling equipment.

OTHER EQUIPMENT:

MEASURES TO BE TAKEN DURING REPAIR AND MAINTENANCE OF CONTAMINATED EQUIPMENT THAT HAS BEEN IN CONTACT WITH THIS MATERIAL: NAIF

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: None

OTHER PRECAUTIONS: Adequate exhaust

NOTE:

As supplied by General Electric we know of no hazards related to our product beyond those that might be expected in grinding any material. The product contains diamond, tungsten carbide and cobalt in aggregate or solid form. Grinding sintered tungsten carbide/cobalt tooling has been well established in the metal working industry for more than 50 years. The precautions used comprise of safety shields, safety eye glasses, and good ventilation with well-placed air intakes near the source of the grinding dust. The cobalt content of the diamond table is less than 10% by weight. The tungsten carbide is standard commercial grade and contains about 13% cobalt by weight. The cobalt involved here is solid and should present no additional hazards as long as local exhaust ventilation is provided.

MATERIAL SAFETY DATA SHEET

COOK'S INDUSTRIAL LUBRICANTS
5 NORTH STILES STREET
LINDEN, N. J. 07036

REVISION DATE
23-NOV-92

DATE ISSUED
25-NOV-92

IDENTIFICATION AND EMERGENCY INFORMATION

COOK'S PRODUCT NAME:
DRAW S519

COOK'S PRODUCT #:
J5P541G

CHEMICAL NAME:
Petroleum-based E. P. Drawing Oil

CAS #'S:
Mixture

PRODUCT APPEARANCE AND ODOR:
Amber liquid, petroleum odor

CHEMICAL FAMILY:
Petroleum hydrocarbon

SYNONYMS:
Drawing oil

EMERGENCY TELEPHONE:
(201) 862-2500

COMPONENTS AND HAZARD INFORMATION

COMPONENTS: W/W HAZARD DATA (TLV, LD50, LC50, ETC.):

Petroleum-based lubricating oil
CAS #'S 64742-53-6 or
64742-52-5

TLV 5 mg./meter cubed
(as an oil mist)

Chlorinated Paraffin
CAS # 61788-76-9

n/e

Epoxidized Soybean Oil
CAS # 8013-07-8

n/e

Triglyceride
CAS # 8016-28-2

n/e

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM (HMIS):

Health	Flammability	Reactivity
1	1	0

TRANSPORTATION INFORMATION

TRANSPORTATION INCIDENT INFORMATION:

ICC: Compound or lubricant. Metal cutting, drawing or drilling.
Dry, liquid or paste. NOI

EMERGENCY FIRST AID

EYE CONTACT:

If splashed into the eyes, flush with clear water for 15 minutes or until irritation subsides. If irritation persists, call a physician.

TRW-00678

0908-2044

EMERGENCY FIRST AID

SKIN CONTACT:

In case of skin contact, remove contaminated clothing and wash skin thoroughly with soap and water.

INHALATION:

Vapor pressure is very low. Vapor inhalation under ambient conditions is normally not a problem. If overcome by vapor from hot product, immediately remove from exposure and call a physician. If breathing is irregular or has stopped, start resuscitation; administer oxygen if available. If overexposure to oil mist, remove from further exposure until excessive oil mist condition subsides.

INGESTION:

If ingested, do not induce vomiting. Call a physician immediately.

FIRE AND EXPLOSION HAZARD INFORMATION

FLASH POINT (MINIMUM):

160°C (320°F) Test method: COC

AUTOIGNITION TEMPERATURE:

N/E

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) - HAZARD IDENTIFICATION:

Health	Flammability	Reactivity
1	1	0

FLAMMABLE OR EXPLOSIVE LIMITS (approximate percent by volume in air):

Estimated values: lower 1% upper 6%

EXTINGUISHING MEDIA AND FIRE FIGHTING PROCEDURES:

Foam, water spray (fog), dry chemical, carbon dioxide and vaporizing liquid type extinguishing agents may all be suitable for extinguishing fires involving this type product, depending on size or potential size of fire and circumstance related to the situation. Plan fire protection and response strategy through consultation with local fire protection authorities or appropriate specialists.

The following procedures for this type of product are based on the recommendations in the National Fire Protection Association's "Fire Protection Guide on Hazardous Materials", Eighth Edition (1984):

Use water spray, dry chemical, foam, or carbon dioxide. Water or foam may cause frothing. Use water to keep fire-exposed containers cool. Water froth may be used to flush spills away from exposure. Minimize breathing gases, vapor, fumes, or decomposition products. Use supplied-air breathing equipment for enclosed or confined spaces or as otherwise needed.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

n/a

TRW-00679

"EMPTY" CONTAINER WARNING:

Empty containers retain residue (liquid or vapor) and can be dangerous. DO NOT PRESSURIZE, WELD, CUT BRAZE, SOLDER, DRILL, GRIND OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, OR OTHER SOURCES OF IGNITION; THEY MAY EXPLODE AND CAUSE INJURY OR DEATH. Do not attempt to clean since residue is difficult to remove. "Empty" drums should be completely drained, properly bunged, and returned to a drum reconditioner. All other containers should be disposed of in an environmentally safe manner and in accordance with

FIRE AND EXPLOSION HAZARD INFORMATION

government regulations. For work on tanks refer to Occupational Safety and Health Administration regulations, ANSI Z49.1, and other governmental and industrial references pertaining to cleaning, repairing, welding, or other contemplated operations.

HEALTH AND HAZARD INFORMATION

EXPOSURE LIMIT FOR TOTAL PRODUCT:

5 mg/cubic meter for oil mist in air

BASIS:

OSHA Regulation 29 CFR 1910.1000

VARIABILITY AMONG INDIVIDUALS:

Health studies have shown that many petroleum hydrocarbons and synthetic lubricants pose potential human health risks which vary from person to person. As a precaution, exposure to liquids, vapors, mists, or fumes should be minimized.

EFFECTS OF OVEREXPOSURE (Signs and symptoms of exposure):

Prolonged or repeated skin contact with this product tends to remove skin oils possibly leading to irritation and dermatitis; however, based on human experience and available toxicological data, this product is judged to be neither a "corrosive" nor an "irritant" by OSHA criteria. Product contacting the eye may cause irritation.

Product has a low order of oral and dermal toxicity. Possible aspiration hazard. Induced vomiting may cause aspiration of product into the lungs. (See Emergency First Aid Section).

PHYSICAL DATA

The following data are approximate or typical values and should not be used for precise design purposes.

BOILING RANGE:

Wide range

VAPOR PRESSURE:

< 0.1 @ 38°C/100°F

SPECIFIC GRAVITY (25°C/25°C):

(WATER = 1)

< 1.0

VAPOR DENSITY (AIR = 1):

> 8

MOLECULAR WEIGHT:

Wide range

PERCENT VOLATILE BY VOLUME:

Negligible

EVAPORATION RATE @ 1 ATM. AND 25°C

(77°F) (n-BUTYL ACETATE = 1):

< 1.0

SOLUBILITY IN WATER @ 1 ATM. and 25°C

(77°F):

Negligible

POUR, CONGEALING OR MELTING POINT:

n/e

FREEZING POINT:

n/e

REACTIVITY

This product is stable and will NOT react violently with water. Hazardous polymerization will not occur. Avoid contact with strong oxidants such as liquid chlorine, concentrated oxygen, sodium hypochlorite or calcium

REACTIVITY

hypochlorite.

DECOMPOSITION PRODUCTS UNDER FIRE CONDITIONS:

Fumes, smoke, carbon monoxide, hydrogen chloride and other decomposition products in case of incomplete combustion.

CONDITIONS TO AVOID:

Open flames.

TOXICITY

ORAL (Acute)	LD 50 > 5 g/kg (total body weight)
DERMAL (Acute)	LD 50 > 3.16 g/kg (total body weight)
EYE	N/E
INHALATION (Acute)	N/E
CHRONIC, SUBCHRONIC, ETC.	N/E

Medical Conditions Aggravated by Exposure: Unknown

This product does NOT contain any ingredients identified as carcinogenic by IRAC, NTP, or OSHA.

Chlorinated paraffins are a class of compounds that are similarly manufactured but which vary in molecular structure by carbon chain length and degree of chlorination. The chlorinated paraffin contained in this product has not been shown to have adverse health effects. While tests have been conducted by the National Toxicology Program on other specific chlorinated paraffins, the relevance of these studies to the chlorinated paraffin contained in this product, if any, has not been determined.

SARA Section 313 Status: This material is not known to contain any chemicals on the SARA Section 313 list at a concentration greater than 1.0 percent or carcinogenic chemical on that list at a concentration greater than 0.1 percent.

SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:

Keep product out of sewers and watercourses by diking or impounding. Absorb with sand or inert material. Sweep or scoop up and remove. Prevent spread of spill. Advise authorities if product has entered or may enter sewers, watercourses or extensive land areas. Assure conformity with local regulations.

WASTE DISPOSAL METHOD: (Consult federal, state, or local authorities for proper disposal procedures.)

Assure conformity with applicable disposal regulations. Dispose of absorbed material at an approved waste site or facility.

PROTECTION AND PRECAUTIONS

VENTILATION: (Always maintain below permissible exposure limits.)

Use local exhaust to capture vapor, mist or fumes, if necessary. Provide

TRW-00681

0908-2047

PROTECTION AND PRECAUTIONS

greater than 60 feet per minute hood face velocity for confined spaces. Provide ventilation sufficient to prevent exceeding recommended exposure limit or buildup of explosive concentrations of vapor in air.

RESPIRATORY PROTECTION: (Use only NIOSH approved equipment.)

Normally not needed at ambient temperatures. Use supplied air respiratory protection in confined or enclosed spaces, if needed. Use filter, dust, fume, or mist respirator type under misting conditions. Use can or cartridge; gas or vapor respirator type under conditions exceeding TWA standard.

PROTECTIVE GLOVES:

Use chemical-resistant gloves, if needed, to avoid prolonged or repeated skin contact.

EYE PROTECTION:

Use splash goggles or face shield when eye contact may occur.

OTHER PROTECTIVE EQUIPMENT:

Use chemical-resistant apron or other impervious clothing, if needed, to avoid contaminating regular clothing which could result in prolonged or repeated skin contact.

WORK PRACTICES/ENGINEERING CONTROLS:

Keep containers closed when not in use. Do not handle near heat, sparks, flame, or strong oxidants.

PERSONAL HYGIENE:

Minimize breathing vapor, mist, or fumes. Avoid prolonged or repeated contact with skin. Remove contaminated clothing; launder or dry-clean before reuse. Remove contaminated shoes and thoroughly clean before reuse; discard if oil-soaked. Cleanse skin thoroughly after contact, before breaks and meals, and at end of work period. Product is readily removed from skin by waterless hand cleaners followed by washing thoroughly with soap and water.

PREPARED BY: PETER KONOPI MANAGER OF QUALITY ASSURANCE

THE ABOVE INFORMATION IS ACCURATE TO THE BEST OF OUR KNOWLEDGE. HOWEVER, SINCE DATA, SAFETY STANDARDS, AND GOVERNMENT REGULATIONS ARE SUBJECT TO CHANGE AND THE CONDITIONS OF HANDLING AND USE, OR MISUSE ARE BEYOND OUR CONTROL, SELLER MAKES NO WARRANTY, EITHER EXPRESS OR IMPLIED, WITH RESPECT TO THE COMPLETENESS OR CONTINUING ACCURACY OF THE INFORMATION CONTAINED HEREIN AND DISCLAIMS ALL LIABILITY FOR RELIANCE THEREON. USER SHOULD SATISFY HIMSELF THAT HE HAS ALL CURRENT DATA RELEVANT TO HIS PARTICULAR USE.

TRW-00682

0908-2048

MATERIAL SAFETY DATA SHEET

COOK'S INDUSTRIAL LUBRICANTS
5 NORTH STILES STREET
LINDEN, N.J. 07036

REVISION DATE
13-JUL-89

DATE ISSUED
05-MAR-90

IDENTIFICATION AND EMERGENCY INFORMATION

COOK'S PRODUCT NAME:
Cook Draw 4625

COOK'S PRODUCT #:
J5P701G

CHEMICAL NAME:
Petroleum-based E. P. Drawing Oil

CAS #'S:
Mixture

PRODUCT APPEARANCE AND ODOR:
Amber liquid, petroleum odor

CHEMICAL FAMILY:
Petroleum hydrocarbon

SYNONYMS:
Petroleum-based lubricating oil

EMERGENCY TELEPHONE:
(201) 662-2500

COMPONENTS AND HAZARD INFORMATION

COMPONENTS: W/W HAZARD DATA (TLV, LD50, LC50, ETC.):

Petroleum-based lubricating oil TLV 5 mg/meter cubed
CAS #'S 64742-53-6 or (as an oil mist)
64742-52-5

Chlorinated Paraffin n/e
CAS #'s 68920-70-7

Proprietary additives n/e

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM (HMIS):

Health	Flammability	Reactivity	Basis
2	1	1	---

TRANSPORTATION INFORMATION

TRANSPORTATION INCIDENT INFORMATION:

ICC: Compound or lubricant. Metal cutting, drawing or drilling.
Dry, liquid or paste. NOI

EMERGENCY FIRST AID

EYE CONTACT:

If splashed into the eyes, flush with clear water for 15 minutes or until irritation subsides. If irritation persists, call a physician.

SKIN CONTACT:

In case of skin contact, remove contaminated clothing and wash skin thoroughly with soap and water.

TRW-00683

0908-2049

EMERGENCY FIRST AID

INHALATION:

Vapor pressure is very low. Vapor inhalation under ambient conditions is normally not a problem. If overcome by vapor from hot product, immediately remove from exposure and call a physician. If breathing is irregular or has stopped, start resuscitation; administer oxygen if available. If overexposure to oil mist, remove from further exposure until excessive oil mist condition subsides.

INGESTION:

If ingested, do not induce vomiting. Call a physician immediately.

FIRE AND EXPLOSION HAZARD INFORMATION

FLASH POINT (MINIMUM):

160°C (320°F) Test method: COC

AUTOIGNITION TEMPERATURE:

N/E

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) - HAZARD IDENTIFICATION:

Health	Flammability	Reactivity	Basis
1	1	0	Recommended by Exxon

FLAMMABLE OR EXPLOSIVE LIMITS (approximate percent by volume in air):

Estimated values: lower 1% upper 6%

EXTINGUISHING MEDIA AND FIRE FIGHTING PROCEDURES:

Foam, water spray (fog), dry chemical, carbon dioxide and vaporizing liquid type extinguishing agents may all be suitable for extinguishing fires involving this type product, depending on size or potential size of fire and circumstances related to the situation. Plan fire protection and response strategy through consultation with local fire protection authorities or appropriate specialists.

The following procedures for this type of product are based on the recommendations in the National Fire Protection Association's "Fire Protection Guide on Hazardous Materials", Eighth Edition (1984):

Use water spray, dry chemical, foam, or carbon dioxide. Water or foam may cause frothing. Use water to keep fire-exposed containers cool. Water froth may be used to flush spills away from exposure. Minimize breathing gases, vapor, fumes, or decomposition products. Use supplied-air breathing equipment for enclosed or confined spaces or as otherwise needed.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

n/a

"EMPTY" CONTAINER WARNING:

Empty containers retain residue (liquid or vapor) and can be dangerous. DO NOT PRESSURIZE, WELD, CUT BRAZE, SOLDER, DRILL, GRIND OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, OR OTHER SOURCES OF IGNITION; THEY MAY EXPLODE AND CAUSE INJURY OR DEATH. Do not attempt to clean since residue is difficult to remove. "Empty" drums should be completely drained, properly bunged, and returned to a drum reconditioner. All other containers should be disposed of in an environmentally safe manner and in accordance with government regulations. For work on tanks refer to Occupational Safety and Health Administration regulations, ANSI Z49.1, and other governmental and industrial references pertaining to cleaning, repairing, welding, or other contemplated operations.

FIRE AND EXPLOSION HAZARD INFORMATION

HEALTH AND HAZARD INFORMATION

EXPOSURE LIMIT FOR TOTAL PRODUCT:
5 mg/cubic meter for oil mist in air

BASIS:
OSHA Regulation 29 CFR 1910.1000

VARIABILITY AMONG INDIVIDUALS:

Health studies have shown that many petroleum hydrocarbons and synthetic lubricants pose potential human health risks which vary from person to person. As a precaution, exposure to liquids, vapors, mists, or fumes should be minimized.

EFFECTS OF OVEREXPOSURE (Signs and symptoms of exposure):

Prolonged or repeated skin contact with this product tends to remove skin oils possibly leading to irritation and dermatitis; however, based on human experience and available toxicological data, this product is judged to be neither a "corrosive" nor an "irritant" by OSHA criteria. Product contacting the eye may cause irritation.

Product has a low order of oral and dermal toxicity. Possible aspiration hazard. Induced vomiting may cause aspiration of product into the lungs. (See Emergency First Aid Section).

PHYSICAL DATA

The following data are approximate or typical values and should not be used for precise design purposes.

BOILING RANGE:
Wide range

VAPOR PRESSURE:
< 0.1 @ 38°C/100°F

SPECIFIC GRAVITY (25°C/25°C):
(WATER = 1)
< 1.0

VAPOR DENSITY (AIR = 1):
> 8

MOLECULAR WEIGHT:
Wide range

PERCENT VOLATILE BY VOLUME:
Negligible

EVAPORATION RATE @ 1 ATM. AND 25°C
(77°F) (n-BUTYL ACETATE = 1):
< 1.0

SOLUBILITY IN WATER @ 1 ATM. and 25°C
(77°F):
Negligible

POUR, CONGEALING OR MELTING POINT:
n/e

FREEZING POINT:
n/e

REACTIVITY

This product is stable and will NOT react violently with water. Hazardous polymerization will not occur. Avoid contact with strong oxidants such as liquid chlorine, concentrated oxygen, sodium hypochlorite or calcium hypochlorite.

DECOMPOSITION PRODUCTS UNDER FIRE CONDITIONS:

Fumes, smoke, carbon monoxide, hydrogen chloride and other decomposition

REACTIVITY

Products in case of incomplete combustion.

CONDITIONS TO AVOID:

Open flames.

TOXICITY

ORAL (Acute)	LD 50 > 5 g/kg (total body weight)
DERMAL (Acute)	LD 50 > 3.16 g/kg (total body weight)
EYE	N/E
INHALATION (Acute)	N/E
CHRONIC, SUBCHRONIC, ETC.	N/E

Medical Conditions Aggravated by Exposure: Unknown

This product does NOT contain any ingredients identified as carcinogenic by IRAC, NTP, or OSHA.

Chlorinated paraffins are a class of compounds that are similarly manufactured but which vary in molecular structure by carbon chain length and degree of chlorination. The chlorinated paraffin contained in this product has not been shown to have adverse health effects. While tests have been conducted by the National Toxicology Program on other specific chlorinated paraffins, the relevance of these studies to the chlorinated paraffin contained in this product, if any, has not been determined.

ARA Section 313 Status: This material is not known to contain any chemicals on the SARA Section 313 list at a concentration greater than 1.0 percent or carcinogenic chemical on that list at a concentration greater than 0.1 percent.

SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:

Keep product out of sewers and watercourses by diking or impounding. Absorb with sand or inert material. Sweep or scoop up and remove. Prevent spread of spill. Advise authorities if product has entered or may enter sewers, watercourses or extensive land areas. Assure conformity with local regulations.

WASTE DISPOSAL METHOD: (Consult federal, state, or local authorities for proper disposal procedures.)

Assure conformity with applicable disposal regulations. Dispose of absorbed material at an approved waste site or facility.

PROTECTION AND PRECAUTIONS

VENTILATION: (Always maintain below permissible exposure limits.)

Use local exhaust to capture vapor, mist or fumes, if necessary. Provide greater than 60 feet per minute hood face velocity for confined spaces.

Provide ventilation sufficient to prevent exceeding recommended exposure limit or buildup of explosive concentrations of vapor in air.

PROTECTION AND PRECAUTIONS

RESPIRATORY PROTECTION: (Use only NIOSH approved equipment.)

Normally not needed at ambient temperatures. Use supplied air respiratory protection in confined or enclosed spaces, if needed. Use filter, dust, fume, or mist respirator type under misting conditions. Use can or cartridge; gas or vapor respirator type under conditions exceeding TWA standard.

PROTECTIVE GLOVES:

Use chemical-resistant gloves, if needed, to avoid prolonged or repeated skin contact.

EYE PROTECTION:

Use splash goggles or face shield when eye contact may occur.

OTHER PROTECTIVE EQUIPMENT:

Use chemical-resistant apron or other impervious clothing, if needed, to avoid contaminating regular clothing which could result in prolonged or repeated skin contact.

WORK PRACTICES/ENGINEERING CONTROLS:

Keep containers closed when not in use. Do not handle near heat, sparks, flame, or strong oxidants.

PERSONAL HYGIENE:

Minimize breathing vapor, mist, or fumes. Avoid prolonged or repeated contact with skin. Remove contaminated clothing; launder or dry-clean before reuse. Remove contaminated shoes and thoroughly clean before reuse; discard if oil-soaked. Cleanse skin thoroughly after contact, before breaks and meals, and at end of work period. Product is readily removed from skin by waterless hand cleaners followed by washing thoroughly with soap and water.

PREPARED BY: Dave Townsend Product Safety Manager

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TRW-00687

0908-2053



COOK DRAW 4625

Transparent, Light Viscosity, Chlorine, Fatty Stamping Oil

DESCRIPTION

Cook Draw 4625 is a clear, light yellow product expressly designed with lowered surface tension and lowered viscosity to eliminate any pick-up of the work piece by the die in high speed stamping operations. A high percentage of natural fats in the finished product, together with a carefully selected light viscosity petroleum base oil assures both extra lubricity and metal wetting and penetrating ability. It is also highly compounded with chlorine to supply the extreme pressure property to the oil film for effective protection of work and die against scoring and abrading. Cook Draw 4625 will permit uniform, high speed production and long die life. It is nonstaining and may be used in forming any metal.

APPLICATION

Cook Draw 4625 is generally applied by gravity feed to pad or wiper in contact with strip carbon steels. It is particularly adaptable to high speed stamping and blanking operations. The light oil film left on formed parts may be removed by conventional vapor degreasing, cold degreasing or hot alkaline wash.

PROPERTIES

Gravity, API @ 60F	13.1
Density, lbs/gal @ 60F	8.15
Viscosity, SSU @ 100F	150
Color, ASTM	2-1/2
Flash Point, F	350
Chlorine, % wt.	9.2
Saponification No.	29.7

W-00688

0908-2054

COOK'S INDUSTRIAL LUBRICANTS
5 North Stiles Street
P. O. Box 87
Linden, N. J. 07036
Telephone: (201) 862-2500
Tux: 710-996-5915
Fax: (800) 446-5888

05-MAR-90

TRW FASTENERS DIV
195 BINNEY ST
ATTN: DICK RUSSEL PLANT MGR
CAMBRIDGE MA
021420000

To Whom It May Concern:

As you requested, attached is a copy of a Material Safety Data Sheet covering CDRAW4625D

Title III of the Superfund Amendments and Reauthorizations Acts (SARA) requires chemical suppliers of mixtures and trade name products to provide information to their customers sufficient for them to comply with the requirements of Section 313.

Cook's has updated our Material Safety Data Sheets (MSDS's) to include the section 313 information and is distributing to all customers the revised MSDS's with shipment of product in 1989.

If you need any further information, please call.

Very Truly Yours,

David L. Townsend
Product Safety Manager

TRW-00689

0908-2055

MATERIAL SAFETY DATA SHEET "ESSENTIALLY SIMILAR" TO OSHA FORM 20 FORM 4040 (Rev. 5-84)		ADDRESS: Pennwalt Corporation Cook's Industrial Lubricants 5 North Stiles Street Linden, N.J. 07036 Emergency Phone Number(s) Business: 201-862-2500 Other:	
PRODUCT IDENTIFICATION	Pennwalt Product Name Cook Dri 1927		Pennwalt Code No. N9U551A
	Chemical Name and Molecular Formula Complex mixture of petroleum solvent and chlorinated paraffins.		CAS No.(s) Mixture
	Synonyms		Chemical Family Petroleum hydrocarbon
HAZARDOUS INGREDIENTS	MATERIALS OR COMPONENTS Petroleum Naphtha Heavy Alkalyd (CAS # 64741-65-7) Chlorinated paraffin (CAS # 63449.39.8)		HAZARD DATA (TLV, LD50, LC50, etc.) Mfg. Recomm. 200 ppm TWA NE
	APPROVED		
SHIPPING INFORMATION	DOT: COMBUSTIBLE LIQUID, N.O.S. NA1993 <div style="text-align: right;">OCT 25 1985 ENVIRONMENTAL ENGINEERING</div>		
PHYSICAL PROPERTIES	Boiling Point/Range Wide Range °C °F NA °C °F		Freezing Point NA °C °F
	Molecular Weight (Calculated) Wide Range		
	Specific Gravity (H ₂ O=1) 0.795 @ 25 / 25 °C		Vapor Pressure (mm Hg) <0.1 @ 38 °C 100 °F
	Vapor Density (Air=1) > 6		
FIRE AND EXPLOSION DATA	Solubility in H ₂ O Negligible		% Volatiles by Volume 96
	Evaporation Rate > 1.0 <input type="checkbox"/> Ether = 1 <input checked="" type="checkbox"/> Water = 1 <input type="checkbox"/> Butylacetate = 1		
	Appearance and Odor Clear liquid, bland odor.		Other
	Flash Point 63 °C 145 °F Closed Cup		Test Method Closed Cup
REACTIVITY DATA	Flammable Limits Lower NE % Upper %		Autoignition Temperature/Fire Point NE °C °F
	EXTINGUISHING MEDIA <input type="checkbox"/> Water-spray <input type="checkbox"/> Water-fog <input type="checkbox"/> Water-stream <input checked="" type="checkbox"/> CO ₂ <input checked="" type="checkbox"/> Dry chemical <input type="checkbox"/> Alcohol foam <input checked="" type="checkbox"/> Foam <input type="checkbox"/> Earth or sand		
	SPECIAL FIRE FIGHTING PROCEDURES <input type="checkbox"/> Do not enter building <input type="checkbox"/> Allow fire to burn <input type="checkbox"/> Water may cause frothing <input type="checkbox"/> Do not use water <input checked="" type="checkbox"/> Use self-contained breathing apparatus		
	UNUSUAL FIRE AND EXPLOSION HAZARDS <input type="checkbox"/> Dust explosion hazard <input type="checkbox"/> Sensitive to shock <input type="checkbox"/> Contamination <input type="checkbox"/> Temperature <input type="checkbox"/> Other (specify): NA		
STABILITY	STABILITY <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Unstable		CONDITIONS CONTRIBUTING TO INSTABILITY <input type="checkbox"/> Thermal decomposition NA <input type="checkbox"/> Photo degradation <input type="checkbox"/> Polymerization <input type="checkbox"/> Contamination
	INCOMPATIBILITY - Avoid contact with <input type="checkbox"/> Strong acids <input type="checkbox"/> Strong alkalis <input checked="" type="checkbox"/> Strong oxidizers <input type="checkbox"/> Other (specify):		
	HAZARDOUS DECOMPOSITION PRODUCTS - THERMAL AND OTHER (list) Hydrogen chloride and carbon monoxide may form upon incomplete combustion.		
	CONDITIONS TO AVOID <input type="checkbox"/> Heat <input checked="" type="checkbox"/> Open flames <input checked="" type="checkbox"/> Sparks <input checked="" type="checkbox"/> Ignition sources <input type="checkbox"/> Other (specify):		
SPILL OR LEAK	STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED <input type="checkbox"/> Flush with water <input checked="" type="checkbox"/> Absorb with sand or inert material <input type="checkbox"/> Neutralize <input checked="" type="checkbox"/> Sweep or scoop up and remove <input checked="" type="checkbox"/> Keep upwind. Evacuate enclosed spaces. <input checked="" type="checkbox"/> Prevent spread of spill		
	WASTE DISPOSAL METHOD - Consult federal, state, or local authorities for proper disposal procedures. Assure conformity with applicable disposal regulations. Dispose of absorbed material at an approved waste disposal site or facility.		

TRW-00690

Before using product, read and follow directions and precautions on product label and bulletins.

TOXICITY	Oral (acute)	NE		
	Dermal (acute)	NE		
	Eye	NE	Inhalation (acute)	NE
	Chronic, Subchronic, etc.			
NE				
HEALTH HAZARD INFORMATION Symptoms First Aid Effects of Exposure	PERMISSIBLE EXPOSURE LIMIT (Specify if TLV/TWA or Ceiling [c])			
	ACGIH 19		NE	OSHA 19
	NE		NE	Other: Mfg. Recomm. 200 ppm TWA (solvent)
	IRRITATION	<input checked="" type="checkbox"/> Skin	<input type="checkbox"/> Severe	<input type="checkbox"/> Moderate
		<input checked="" type="checkbox"/> Eye	<input type="checkbox"/> Severe	<input type="checkbox"/> Moderate
				<input type="checkbox"/> Mild (transient)
	CORROSIVITY	<input type="checkbox"/> Skin	<input type="checkbox"/> 4 hrs. (DOT)	<input type="checkbox"/> 24 hrs. (CPSC)
		<input type="checkbox"/> Eye	<input type="checkbox"/> May cause blindness	
	SENSITIZATION	<input type="checkbox"/> Skin	<input type="checkbox"/> Respiratory	<input type="checkbox"/> Allergen
		NA		INHALATION EFFECTS
			<input type="checkbox"/> Narcotic effect	
			NA	
			<input type="checkbox"/> Cyanosis	
			<input type="checkbox"/> Asphyxiant	
LUNG EFFECTS (Specify):				
Inhalation of vapor causes respiratory irritation.				
OTHER (Specify):				
<input checked="" type="checkbox"/> Repeated contact - skin defatter				
<input type="checkbox"/> Other (Specify):				
INGESTION				
<input type="checkbox"/> Induce vomiting				
<input checked="" type="checkbox"/> Do NOT induce vomiting				
<input type="checkbox"/> Give plenty of water				
<input checked="" type="checkbox"/> Get medical attention				
<input type="checkbox"/> Other (specify):				
DERMAL				
<input checked="" type="checkbox"/> Flush with soap and water				
<input type="checkbox"/> Get medical attention				
<input checked="" type="checkbox"/> Contaminated clothing - remove & launder				
<input type="checkbox"/> Contaminated shoes - destroy				
<input type="checkbox"/> Other (specify):				
EYE CONTACT				
<input checked="" type="checkbox"/> Flush with plenty of water for at least 15 minutes				
<input checked="" type="checkbox"/> Get medical attention				
<input type="checkbox"/> Other (specify):				
INHALATION				
<input checked="" type="checkbox"/> Remove to fresh air				
<input type="checkbox"/> If not breathing, give artificial respiration				
<input type="checkbox"/> Give oxygen				
<input type="checkbox"/> Get medical attention				
<input type="checkbox"/> Other (specify):				
SPECIAL PROTECTION INFORMATION	VENTILATION REQUIREMENTS - Always maintain exposure below permissible exposure limits			
	<input type="checkbox"/> Consult an industrial hygienist or environmental health specialist			
	<input checked="" type="checkbox"/> Local exhaust			
	<input type="checkbox"/> Use with adequate ventilation			
	<input type="checkbox"/> Check for air contaminant and oxygen deficiency			
	<input checked="" type="checkbox"/> Other (specify): To control to standard.			
	EYE			
	<input type="checkbox"/> Safety glasses			
	<input type="checkbox"/> Face shield and goggles			
	<input checked="" type="checkbox"/> Goggles			
HAND (GLOVE TYPE)				
<input type="checkbox"/> Polyvinyl chloride				
<input checked="" type="checkbox"/> Neoprene				
<input type="checkbox"/> Buty rubber				
<input type="checkbox"/> Natural rubber				
<input checked="" type="checkbox"/> Polyvinyl alcohol				
<input type="checkbox"/> Poly-ethylene				
<input type="checkbox"/> Other (specify):				
RESPIRATOR TYPE - Use only NIOSH approved equipment				
<input type="checkbox"/> Self-contained				
<input type="checkbox"/> Supplied air				
<input checked="" type="checkbox"/> Can or cartridge gas or vapor				
<input type="checkbox"/> Filter - dust, fume, mist				
<input type="checkbox"/> Other* Under conditions (specify): exceeding TWA standard				
OTHER PROTECTIVE EQUIPMENT				
<input type="checkbox"/> Rubber boots				
<input checked="" type="checkbox"/> Apron				
<input type="checkbox"/> Other (specify):				
SPECIAL PRECAUTIONS	PRECAUTIONARY LABELING			
	<input checked="" type="checkbox"/> Wash thoroughly after handling			
	<input checked="" type="checkbox"/> Do not get in eyes, on skin or clothing			
	<input checked="" type="checkbox"/> Do not breathe dust, vapor, mist, gas			
	<input checked="" type="checkbox"/> Keep container closed			
	<input checked="" type="checkbox"/> Keep away from heat, sparks, and open flames			
	<input checked="" type="checkbox"/> Store in tightly closed containers			
	<input type="checkbox"/> Do not store near combustibles			
	<input type="checkbox"/> Keep from contact with clothing and other combustible materials			
	<input checked="" type="checkbox"/> Empty container may contain hazardous residues			
<input type="checkbox"/> Use explosion proof equipment				
<input type="checkbox"/> Other (specify):				
Other handling and storage conditions				
CAUTION COMBUSTIBLE!!				
Avoid prolonged or repeated contact with skin. Wash thoroughly with soap and water after contact. Remove contaminated clothing. Launder before reuse. Avoid breathing mist or vapor.				
Prepared by		Date	Address	
J. J. J. J.		9/30/85		
PLEASE NOTE		The above information is accurate to the best of our knowledge. However, since data, safety standards, and government change and the conditions of handling and use, or misuse are beyond our control, Pennwalt MAKES NO WARRANTY, EIT. IMPLIED, WITH RESPECT TO THE COMPLETENESS OR CONTINUING ACCURACY OF THE INFORMATION CONTAINED HEREIN AND DISCLAIMS ALL LIABILITY FOR RELIANCE THEREON. User should satisfy himself that he has all current data relevant to his particular use.		
		0908-2057		

INTER-OFFICE COMMUNICATION

FORM NO. SF2

FROM: D.F. Borsuk

➔ TO: R. Smith

DATE 10/25/85

SUBJECT Cook Dri 1927

Roger,

The attached material safety data sheet is for the substance
Cook Dri 1927 which will be used at the Binney Street facility
on an experimental basis. Please inform me of the change in status
of the substance and when it will be no longer used.

Thanks,

SIGNATURE

Dennis

RETURN TO:

DATE

REPLY:

SIGNATURE

ORIGINATOR - DETACH AND RETAIN

0908-2058

TRW-00692

MATERIAL SAFETY DATA SHEET "ESSENTIALLY SIMILAR" TO OSHA FORM 20 FORM 4040 (Rev. 5-84)		ADDRESS: Pennwalt Corporation Cook's Industrial Lubricants 5 North Stiles Street Linden, NJ 07036 Emergency Phone Number(s) Business: 201-862-2500 Other:	
PRODUCT IDENTIFICATION	Pennwalt Product Name <u>Cook Dri 4706</u>		Pennwalt Code No. <u>E2I701A</u>
	Chemical Name and Molecular Formula <u>Petroleum solvent.</u>		
	Synonyms		
		CAS No.(s) <u>64741-65-7</u>	
		Chemical Family <u>Petroleum Hydrocarbon</u>	
HAZARDOUS INGREDIENTS	MATERIALS OR COMPONENTS		% w/w
	<u>Petroleum naphtha light aklayd</u> (CAS # 64741-65-7)		
HAZARD DATA (TLV, LD50, LC50, etc.)			
<u>300 ppm TWA</u>			
SHIPPING INFORMATION	DOT: Combustible liquid, NOS NA 1993		
PHYSICAL PROPERTIES	Boiling Point/Range <u>183-197 °C</u> °F		Melting Point <u>NA</u> °C °F
	Freezing Point <u>NA</u> °C °F		Molecular Weight (Calculated) <u>Wide Range</u>
	Specific Gravity (H ₂ O=1) <u>0.761</u> @ <u>25</u> / <u>25</u> °C		Vapor Pressure (mm Hg) <u>< 0.01</u> @ <u>38</u> °C 100 °F
	Vapor Density (Air=1) <u>> 8</u>		Evaporation Rate <u>> 38</u> <input checked="" type="checkbox"/> Ether = 1 <input type="checkbox"/> Water = 1 <input type="checkbox"/> Butylacetate = 1
	Solubility in H ₂ O <u>Negligible</u>		% Volatiles by Volume <u>100</u>
FIRE AND EXPLOSION DATA	Flash Point <u>61 °C</u> 142 °F <u>Closed Cup</u>		Test Method <u>Closed Cup</u>
	Flammable Limits Lower <u>N/A</u> % Upper <u>NA</u> %		Autoignition Temperature/Fire Point <u>NA</u> °C °F
	EXTINGUISHING MEDIA <input type="checkbox"/> Water-spray <input type="checkbox"/> Water-fog <input type="checkbox"/> Water stream <input checked="" type="checkbox"/> CO ₂ <input checked="" type="checkbox"/> Dry chemical <input type="checkbox"/> Alcohol foam <input checked="" type="checkbox"/> Foam <input type="checkbox"/> Earth or sand		
	SPECIAL FIRE FIGHTING PROCEDURES <input type="checkbox"/> Do not enter building <input type="checkbox"/> Allow fire to burn <input type="checkbox"/> Water may cause frothing <input type="checkbox"/> Do not use water <input checked="" type="checkbox"/> Use self-contained breathing apparatus		
	UNUSUAL FIRE AND EXPLOSION HAZARDS <input type="checkbox"/> Dust explosion hazard <input type="checkbox"/> Sensitive to shock <input type="checkbox"/> Contamination <input type="checkbox"/> Temperature <input type="checkbox"/> Other (specify): <u>NA</u>		
REACTIVITY DATA	STABILITY <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Unstable		CONDITIONS CONTRIBUTING TO INSTABILITY <input type="checkbox"/> Thermal decomposition <u>NA</u> <input type="checkbox"/> Photo degradation <input type="checkbox"/> Polymerization <input type="checkbox"/> Contamination
	INCOMPATIBILITY - Avoid contact with <input type="checkbox"/> Strong acids <input type="checkbox"/> Strong alkalis <input checked="" type="checkbox"/> Strong oxidizers <input type="checkbox"/> Other (specify):		
	HAZARDOUS DECOMPOSITION PRODUCTS - THERMAL AND OTHER (list) <u>Carbon monoxide may form upon incomplete combustion.</u>		
	CONDITIONS TO AVOID <input checked="" type="checkbox"/> Heat <input checked="" type="checkbox"/> Open flames <input checked="" type="checkbox"/> Sparks <input checked="" type="checkbox"/> Ignition sources <input type="checkbox"/> Other (specify):		
SPILL OR LEAK	STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED <input type="checkbox"/> Flush with water <input checked="" type="checkbox"/> Absorb with sand or inert material <input type="checkbox"/> Neutralize <input checked="" type="checkbox"/> Sweep or scoop up and remove <input checked="" type="checkbox"/> Keep upwind. Evacuate enclosed spaces <input type="checkbox"/> Prevent spread of spill <input type="checkbox"/> Dispose of immediately <input checked="" type="checkbox"/> Other (specify): <u>Advise authorities if product has entered or may enter sewers, water courses or extensive land areas.</u>		
	WASTE DISPOSAL METHOD - Consult federal, state, or local authorities for proper disposal procedures. Assure conformity with applicable disposal regulations. Dispose of absorbed material at an approved waste disposal site or facility.		

TRW-00693

Before using product, read and follow directions and precautions on product label and bulletins.

TOXICITY	Oral (acute)		NE		
	Dermal (acute)		NE		
	Eye	NE	Inhalation (acute)	NE	
	Chronic, Subchronic, etc.				
NE					
HEALTH HAZARD INFORMATION Emergency First Aid	PERMISSIBLE EXPOSURE LIMIT (Specify if TLV/TWA or Ceiling [c])		Other: Raw material mfg. Recmd.		
	ACGIH 19	NE	OSHA 19	NE	
	IRRITATION		<input checked="" type="checkbox"/> Skin <input checked="" type="checkbox"/> Eye		
	CORROSIVITY		<input type="checkbox"/> Severe <input type="checkbox"/> Severe <input type="checkbox"/> Moderate <input type="checkbox"/> Moderate <input type="checkbox"/> Mild (transient)		
	SENSITIZATION		<input type="checkbox"/> Skin <input type="checkbox"/> Respiratory <input type="checkbox"/> Allergen		
	LUNG EFFECTS (Specify):		<input type="checkbox"/> 4 hrs. (DOT) <input type="checkbox"/> May cause blindness <input type="checkbox"/> 24 hrs. (CPSC)		
	OTHER (Specify):		<input checked="" type="checkbox"/> Repeated contact - skin defatter <input type="checkbox"/> Other (Specify):		
	INGESTION		<input type="checkbox"/> Induce vomiting <input checked="" type="checkbox"/> Do NOT induce vomiting <input type="checkbox"/> Give plenty of water <input checked="" type="checkbox"/> Get medical attention <input type="checkbox"/> Other (specify):		
	DERMAL		<input checked="" type="checkbox"/> Flush with soap and water <input type="checkbox"/> Get medical attention <input checked="" type="checkbox"/> Contaminated clothing - remove & launder <input type="checkbox"/> Contaminated shoes - destroy <input type="checkbox"/> Other (specify):		
	EYE CONTACT		<input checked="" type="checkbox"/> Flush with plenty of water for at least 15 minutes <input checked="" type="checkbox"/> Get medical attention <input type="checkbox"/> Other (specify):		
	INHALATION		<input checked="" type="checkbox"/> Remove to fresh air <input type="checkbox"/> If not breathing, give artificial respiration <input type="checkbox"/> Give oxygen <input type="checkbox"/> Get medical attention <input type="checkbox"/> Other (specify):		
	VENTILATION REQUIREMENTS - Always maintain exposure below permissible exposure limits		<input type="checkbox"/> Consult an industrial hygienist or environmental health specialist <input type="checkbox"/> Local exhaust <input type="checkbox"/> Use with adequate ventilation <input type="checkbox"/> Check for air contaminant and oxygen deficiency		
	OTHER (specify):		To control to standard.		
	SPECIAL PROTECTION INFORMATION	EYE		HAND (GLOVE TYPE)	
		<input type="checkbox"/> Safety glasses <input type="checkbox"/> Face shield and goggles <input checked="" type="checkbox"/> Goggles		<input type="checkbox"/> Polyvinyl chloride <input checked="" type="checkbox"/> Neoprene <input type="checkbox"/> Butyl rubber <input type="checkbox"/> Natural rubber <input checked="" type="checkbox"/> Polyvinyl alcohol <input type="checkbox"/> Polyethylene <input type="checkbox"/> Other (specify):	
RESPIRATOR TYPE - Use only NIOSH approved equipment					
<input type="checkbox"/> Self-contained <input type="checkbox"/> Supplied air <input checked="" type="checkbox"/> Can or cartridge gas or vapor <input type="checkbox"/> Filter - dust, fume, mist <input type="checkbox"/> Other (specify):					
OTHER PROTECTIVE EQUIPMENT					
SPECIAL PRECAUTIONS	PRECAUTIONARY LABELING				
	<input checked="" type="checkbox"/> Wash thoroughly after handling <input checked="" type="checkbox"/> Do not get in eyes, on skin or clothing <input checked="" type="checkbox"/> Do not breathe dust, vapor, mist, gas <input checked="" type="checkbox"/> Keep container closed <input checked="" type="checkbox"/> Keep away from heat, sparks, and open flames <input type="checkbox"/> Store in tightly closed containers				
	<input type="checkbox"/> Do not store near combustibles <input type="checkbox"/> Keep from contact with clothing and other combustible materials <input checked="" type="checkbox"/> Empty container may contain hazardous residues <input type="checkbox"/> Use explosion proof equipment <input type="checkbox"/> Other (specify):				
	Other handling and storage conditions CAUTION COMBUSTIBLE!! Avoid prolonged or repeated contact with skin. Wash thoroughly with soap and water after contact. Remove contaminated clothing. Launder before reuse. Avoid breathing mist or vapor.				
TRW-00694					
Prepared by		Date	Address		
David Tamm		7/12/85			
Phone					
PLEASE NOTE: The above information is accurate to the best of our knowledge. However, since data, safety standards, and government regulations are subject to change and the conditions of handling and use, or misuse are beyond our control, Pennwalt MAKES NO WARRANTY, EITHER EXPRESS OR IMPLIED, WITH RESPECT TO THE COMPLETENESS OR CONTINUING ACCURACY OF THE INFORMATION CONTAINED HEREIN AND DISCLAIMS ALL LIABILITY FOR RELIANCE THEREON. User should satisfy himself that he has all current data relevant to his particular use.					

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MATERIAL SAFETY DATA SHEET "ESSENTIALLY SIMILAR" TO OSHA FORM 20 FORM 4040 (Rev. 5-84)		ADDRESS: Pennwalt Corporation Cook's Industrial Lubricants 5 North Stiles Street Linden, NJ 07036 Emergency Phone Number(s) Business: 201-862-2500 Other:	
PRODUCT IDENTIFICATION	Pennwalt Product Name Cook Draw 5168		Pennwalt Code No. I7M141A
	Chemical Name and Molecular Formula Complex mixture of chlorinated fatty acids. Triethanolamine, ethoxylated fatty ester and hexylene glycol.		CAS No.(s) Mixture
	Synonyms		Chemical Family Synthetic soap solution
HAZARDOUS INGREDIENTS	MATERIALS OR COMPONENTS	% w/w	HAZARD DATA (TLV, LD50, LC50, etc.)
	Triethanolamine (CAS # 102-71-6) Hexylene Glycol (CAS # 107-41-5) Ethoxylated fatty ester		NE TLV Ceiling 25 ppm
SHIPPING INFORMATION	ICC: Compound or lubricant, metal cutting, drawing or drilling. Dry, liquid or paste. NOI		
PHYSICAL PROPERTIES	Boiling Point/Range 100 °C 212 °F		Melting Point NA °C °F
	Specific Gravity (H ₂ O=1) 1.039 @ 25 / 25 °C		Vapor Pressure (mm Hg) NE @ °C °F
	Solubility in H ₂ O Soluble		Evaporation Rate 1.0 <input type="checkbox"/> Ether = 1 <input checked="" type="checkbox"/> Water = 1 <input type="checkbox"/> Butylacetate = 1
	Appearance and Odor Clear blue liquid, chemical odor.		
FIRE AND EXPLOSION DATA	Flash Point NONE °C °F		Test Method NE
	Flammable Limits NE		Autoignition Temperature/Fire Point NE °C °F
	EXTINGUISHING MEDIA <input type="checkbox"/> Water-spray <input type="checkbox"/> Water-fog <input type="checkbox"/> Water stream <input checked="" type="checkbox"/> CO ₂ <input checked="" type="checkbox"/> Dry chemical <input type="checkbox"/> Alcohol foam <input checked="" type="checkbox"/> Foam <input type="checkbox"/> Earth or sand		
	SPECIAL FIRE FIGHTING PROCEDURES <input type="checkbox"/> Do not enter building <input type="checkbox"/> Allow fire to burn <input type="checkbox"/> Water may cause frothing <input type="checkbox"/> Do not use water <input checked="" type="checkbox"/> Use self-contained breathing apparatus		
REACTIVITY DATA	UNUSUAL FIRE AND EXPLOSION HAZARDS <input type="checkbox"/> Dust explosion hazard <input type="checkbox"/> Sensitive to shock <input type="checkbox"/> Contamination <input type="checkbox"/> Temperature <input type="checkbox"/> Other (specify): NA		
	STABILITY <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Unstable		
	CONDITIONS CONTRIBUTING TO INSTABILITY <input type="checkbox"/> Thermal decomposition <input type="checkbox"/> Photo degradation NA <input type="checkbox"/> Polymerization <input type="checkbox"/> Contamination		
	INCOMPATIBILITY - Avoid contact with <input type="checkbox"/> Strong acids <input type="checkbox"/> Strong alkalis <input checked="" type="checkbox"/> Strong oxidizers <input type="checkbox"/> Other (specify):		
SPILL OR LEAK	HAZARDOUS DECOMPOSITION PRODUCTS - THERMAL AND OTHER (list) Hydrogen chloride and carbon monoxide may form upon incomplete combustion.		
	CONDITIONS TO AVOID <input type="checkbox"/> Heat <input type="checkbox"/> Open flames <input type="checkbox"/> Sparks <input type="checkbox"/> Ignition sources <input type="checkbox"/> Other (specify):		
	STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED <input type="checkbox"/> Flush with water <input checked="" type="checkbox"/> Absorb with sand or inert material <input type="checkbox"/> Neutralize <input checked="" type="checkbox"/> Sweep or scoop up and remove <input type="checkbox"/> Keep upwind. Evacuate enclosed spaces. <input checked="" type="checkbox"/> Prevent spread of spill Advise authorities if product has entered or may enter sewers, watercourses or extensive land areas.		
WASTE DISPOSAL METHOD - Consult federal, state, or local authorities for proper disposal procedures. Assure conformity with applicable disposal regulations. Dispose of absorbed material at an approved waste disposal site or facility.			

TRW-00695

CONTINUED ON
REVERSE SIDE

Before using product, read and follow directions and precautions on product label and bulletins.

TOXICITY	Oral (acute)	Hexylene glycol LD 50 Oral : 4000 mg/Kg		
	Dermal (acute)	Hexylene glycol LD 50 Dermal 13200 mg/kg		
	Eye	NE	Inhalation (acute)	NE
	Chronic, Subchronic, etc. NE			
HEALTH HAZARD INFORMATION	PERMISSIBLE EXPOSURE LIMIT (Specify if TLV/TWA or Ceiling [c]) ACGIH 1983 Hexylene glycol 25 ppm ceiling OSHA 19____ Other:			
	IRRITATION <input checked="" type="checkbox"/> Skin <input type="checkbox"/> Severe <input type="checkbox"/> Moderate <input checked="" type="checkbox"/> Eye <input type="checkbox"/> Severe <input type="checkbox"/> Moderate <input type="checkbox"/> Mild (transient)			
	CORROSIVITY NA <input type="checkbox"/> Skin <input type="checkbox"/> 4 hrs. (DOT) <input type="checkbox"/> 24 hrs. (CPSC) <input type="checkbox"/> Eye <input type="checkbox"/> May cause blindness			
	SENSITIZATION <input type="checkbox"/> Skin NE <input type="checkbox"/> Respiratory <input type="checkbox"/> Allergen INHALATION EFFECTS <input type="checkbox"/> Narcotic effect NE <input type="checkbox"/> Cyanosis <input type="checkbox"/> Asphyxiant			
	LUNG EFFECTS (Specify): Inhalation of vapor causes respiratory irritation.			
	OTHER (Specify): <input checked="" type="checkbox"/> Repeated contact - skin defatter <input type="checkbox"/> Other (Specify):			
	INGESTION <input checked="" type="checkbox"/> Induce vomiting <input type="checkbox"/> Do NOT induce vomiting <input type="checkbox"/> Give plenty of water <input checked="" type="checkbox"/> Get medical attention <input type="checkbox"/> Other (specify):			
	DERMAL <input checked="" type="checkbox"/> Flush with soap and water <input type="checkbox"/> Get medical attention <input checked="" type="checkbox"/> Contaminated clothing - remove & launder <input type="checkbox"/> Contaminated shoes - destroy <input type="checkbox"/> Other (specify):			
	EYE CONTACT <input checked="" type="checkbox"/> Flush with plenty of water for at least 15 minutes <input checked="" type="checkbox"/> Get medical attention <input type="checkbox"/> Other (specify):			
	INHALATION <input checked="" type="checkbox"/> Remove to fresh air <input type="checkbox"/> If not breathing, give artificial respiration <input type="checkbox"/> Give oxygen <input type="checkbox"/> Get medical attention <input type="checkbox"/> Other (specify):			
SPECIAL PROTECTION INFORMATION	VENTILATION REQUIREMENTS - Always maintain exposure below permissible exposure limits <input type="checkbox"/> Consult an industrial hygienist or environmental health specialist <input checked="" type="checkbox"/> Local exhaust <input type="checkbox"/> Use with adequate ventilation <input type="checkbox"/> Check for air contaminant and oxygen deficiency			
	<input checked="" type="checkbox"/> Other (specify): To control to standard.			
	EYE <input type="checkbox"/> Face shield and goggles <input checked="" type="checkbox"/> Safety glasses <input checked="" type="checkbox"/> Goggles		HAND (GLOVE TYPE) <input type="checkbox"/> Butyl rubber <input type="checkbox"/> Polyvinyl alcohol <input type="checkbox"/> Other (specify): <input type="checkbox"/> Polyvinyl chloride <input checked="" type="checkbox"/> Neoprene <input type="checkbox"/> Natural rubber <input type="checkbox"/> Polyethylene	
	RESPIRATOR TYPE - Use only NIOSH approved equipment <input type="checkbox"/> Self-contained <input type="checkbox"/> Supplied air <input checked="" type="checkbox"/> Can or cartridge gas or vapor <input type="checkbox"/> Filter - dust, fume, mist <input type="checkbox"/> Other (specify): TWA standard			
	OTHER PROTECTIVE EQUIPMENT <input type="checkbox"/> Rubber boots <input checked="" type="checkbox"/> Apron <input type="checkbox"/> Other (specify):			
SPECIAL PRECAUTIONS	PRECAUTIONARY LABELING <input checked="" type="checkbox"/> Wash thoroughly after handling <input checked="" type="checkbox"/> Do not get in eyes, on skin or clothing <input checked="" type="checkbox"/> Do not breathe dust, vapor, mist, gas <input checked="" type="checkbox"/> Keep container closed <input type="checkbox"/> Keep away from heat, sparks, and open flames <input checked="" type="checkbox"/> Store in tightly closed containers <input type="checkbox"/> Do not store near combustibles <input type="checkbox"/> Keep from contact with clothing and other combustible materials <input type="checkbox"/> Empty container may contain hazardous residues <input type="checkbox"/> Use explosion proof equipment <input type="checkbox"/> Other (specify):			
	Other handling and storage conditions DO NOT MIX WITH NITRITES. Avoid prolonged or repeated contact with skin. Wash thoroughly with soap and water after contact. Remove contaminated clothing. Launder before reuse. Avoid breathing mist or vapor.			
Prepared by D. J. Tamm		Date 8/14/85	Address Phone	
PLEASE NOTE: The above information is accurate to the best of our knowledge. However, since data, safety standards, and government regulations are subject to change and the conditions of handling and use, or misuse are beyond our control, Pennwalt MAKES NO WARRANTY, EITHER EXPRESS OR IMPLIED, WITH RESPECT TO THE COMPLETENESS OR CONTINUING ACCURACY OF THE INFORMATION CONTAINED HEREIN AND DISCLAIMS ALL LIABILITY FOR RELIANCE THEREON. User should satisfy himself that he has all current data relevant to his particular use.				

TRW-00696

0908-2062

from the desk of **Tom Jemas**

Roger,

Cook Dr 1927 osha sheet will follow

~~Besting~~ Jerry R. experimental



COOK'S Industrial Lubricants

5 North Stiles Street • P.O. Box 87 • Linden, New Jersey 07036 • (201) 862-2500

FOUNDED 1868 • Cutting Oils • Drawing Compounds • Soluble Oils • Grinding Fluids • Stamping Oils • Hydraulic Oils • Maintenance Oils

0908-2063

TRW-00697



**Monroe
Chemical**

U.S. DEPARTMENT OF LABOR
WORKPLACE STANDARDS ADMINISTRATION
BUREAU OF LABOR STANDARDS
MATERIAL SAFETY DATA SHEET

Box 810, 36 Draffin Road,
Hilton, N.Y. 14468

SECTION I: MATERIAL AND MANUFACTURER IDENTIFICATION

MANUFACTURER'S NAME
MONROE CHEMICAL COMPANY, INC.

EMERGENCY TELEPHONE NO.
716-392-3434

ADDRESS, NUMBER, STREET, CITY, STATE AND ZIP CODE
36 Draffin Road, Hilton, NY 14468

CHEMICAL NAME AND SYNONYMS
N/A

TRADE NAME AND SYNONYMS
COOL- TOOL Cutting Oil

CHEMICAL FAMILY
N/A

FORMULA
N/A

SECTION II: HAZARDOUS INGREDIENTS*

PAINTS, PRESERVATIVES, SOLVENTS	%	TLV (UNITS)	ALLOYS AND METALLIC COATINGS	%	TLV (UNITS)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS CAS # 71-55-6 1,1,1,-Trichloroethane	33	350ppm	FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES*				%	TLV (UNITS)
Mineral Oil CAS # 8012-95-1				34	5 mg/m ³ mist

SECTION III: PHYSICAL DATA

BOILING POINT (°F)	198	SPECIFIC GRAVITY (H ₂ O = 1)	1.035
VAPOR PRESSURE (mm Hg.) @ 20°C	92.7	PERCENT VOLATILE BY VOLUME (%)	35
VAPOR DENSITY (AIR = 1)	4.5	EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER	nil		

APPEARANCE AND ODOR Golden oil with characteristic odor

SECTION IV: FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD USED: COC greater than 350° F	FLAMMABLE LIMITS	LeI Not determined	UeI
---	------------------	-----------------------	-----

EXTINGUISHING MEDIA
Water fog, Foam, Dry chemical

SPECIAL FIRE FIGHTING PROCEDURES
Use usual procedures as with oil fire, may emit CO₂, CO, HCL

UNUSUAL FIRE AND EXPLOSION HAZARDS

Closed containers will pressurize at high temperature.

SECTION V. HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

350 ppm : 500 ppm Max. for vapor. 5mg/m³ for oil mists.

EFFECTS OF OVEREXPOSURE

Anesthetic effects may occur in the range of 500 to 1000 ppm of vapor

EMERGENCY AND FIRST AID PROCEDURES

Inhalation- remove to fresh air, keep warm and quiet until recovery.

skin and eyes- flush eyes with plenty of water. For skin and eyes get medical attention irritation develops.

Ingestion- treat symptomatically. Low oral toxicity. stomach evacuation may be desired.

SECTION VI: REACTIVITY DATA

STABILITY	UNSTABLE	CONDITIONS TO AVOID
	STABLE	Open flames, welding arcs can decompose vapors.

INCOMPATIBILITY (MATERIALS TO AVOID)

Strong oxidizing agents

HAZARDOUS DECOMPOSITION PRODUCTS Exposure to high temperatures or open flames generates hydrogen chloride and very small amounts of Phosgene and Chlorine.

HAZARDOUS POLYMERIZATION	MAY OCCUR	CONDITIONS TO AVOID
	WILL NOT OCCUR	X

SECTION VII: SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Mop, wipe or soak up with absorbent material and bury in approved landfill.

WASTE DISPOSAL METHOD

Collect and dispose as waste oil in approved landfill or incinerate in approved facility.

SECTION VIII: SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (SPECIFY TYPE)

Concentration above 2%- use self contained breathing apparatus.

VENTILATION	LOCAL EXHAUST	SPECIAL
	MECHANICAL (GENERAL)	OTHER

Provide ventilation to control to TLV

PROTECTIVE GLOVES

Neoprene to avoid prolonged contact

EYE PROTECTION

Safety glasses

OTHER PROTECTIVE EQUIPMENT

None

SECTION IX: SPECIAL PRECAUTIONS

TRW-00699

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Handle with reasonable care. Avoid breathing vapors in concentrations

over 350 ppm with a maximum peak of 500 ppm. Store in cool, dry place.

OTHER PRECAUTIONS

In misting : oil mist should be controlled. Do not weld or cut empty containers.

4/84

0908-2065



EASTERN METAL MILL PRODUCTS COMPANY • 1105 East Street • Dedham, Massachusetts • 01917-1000

MATERIAL SAFETY DATA SHEET

Product Name: Copper/Bronze/Brass Standard & Non-Standard
distributor warehouse items.

Chemical Family: Copper Alloys

Use of Product: article fabrication

Date: 11-18-85

Product includes the following CDA Alloys:

101	230	332*	510
102	240	335*	521
110	260	353*	544*
122	268	360*	642
210	314/316*	365*	655
220	330*	411	752
		485*	

*Denotes leaded alloys

PHYSICAL DATA

Melting Point: 1500-2100° F

Specific Gravity: 7.5-9.0g/cc

Boiling Point: N.A.

Vapor Pressure: N.A.

The product is solid at room temperature and exhibits no odor.

The product is insoluble in water.

CHEMICAL COMPOSITION

Alloys may contain any or all of the chemical constituents listed below:

	CAS No.	Range %	8 Hr. TWA
Copper	7440-50-8	45-99.98	1 mg/M3 dust 0.1 mg/M3 fume
Zinc	7440-66-6	0-43	5 mg/M3 oxide
Aluminum	7429-90-5	0-8	10 mg/M3
Iron	7439-89-6	0-6	10 mg/M3
Lead	7439-92-1	0-4.5	0.05 mg/M3
Manganese	7439-96-5	0-5	1 mg/M3
Nickel	7440-02-0	0-12.0	1 mg/M3
Phosphorus	7723-14-0	0-0.5	0.1 mg/M3
Silicon	7440-21-3	0-4.5	10 mg/M3
Tin	7440-31-5	0-4.5	10 mg/M3

STOREAGE, FIRE & REACTIVITY

Flash Point: N.A. Auto-ignition Temp: N.A. Flammability Limits N.A.

In the form as distributed by Eastern Metal Mill Products Co., there are no fire or explosion hazards with these alloys. Never use water as an extinguishing agent around molten metal. Water will react violently with any molten metal. Copper reacts violently with acetylene.

These solid alloys are stable and non-hazardous at room temperatures. Material may react with acids, bases or oxidizers.

Material in forms as distributed by Eastern Metal does not present a significant health hazard under normal handling and storage conditions.

HEALTH HAZARD DATA

Under normal handling conditions the solid alloy presents no significant health hazards. Processing of the alloy by dust or fume producing operation (grinding, buffing, forgings, etc.) may result in the potential for exposure to airborne metal particulates or fume. When generating dust or chips wear safety masks & glasses.

Chronic exposure to copper, zinc, lead and manganese in unalloyed form or dust may cause metal fume fever. Symptoms of metal fume fever include fever, fatigue, dryness of throat, head and body ache, fever and chill. Overexposure to copper and lead in unalloyed form may result in skin and hair discoloration. Chronic exposure to fume may affect the central nervous system leading to emotional disturbances, gait and balance difficulties and paralysis.

Nickel and lead have been identified as potential cancer causing agents.

The product will not irritate the skin or eyes in bulk form. Particulates may cause dermatitis due to mechanical irritation.

First Aid:

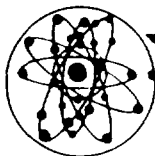
Ingestion: Ingestion of significant amounts of copper alloys are unlikely. Seek medical help if large quantities of product are ingested.

Inhalation: Remove from exposure to dust or fume if present. Seek medical help if required.

Skin Contact: Wash thoroughly with soap and water, possible irritation.

Eye Contact: Flush with water for at least 15 minutes. Seek medical help if required.

TRW-00701



HUSSEY COPPER LTD.

BY: HUSSEY COPPER CORP., GENERAL PARTNER
LEETSDALE, PA 15056

M.S.D.S. HC-85-100

DATE: 3/26/85

REV. DATE: 4/21/86

REVISION NO.: 2

MATERIAL SAFETY DATA SHEET

SECTION I

MANUFACTURER'S NAME: HUSSEY COPPER LTD.
ADDRESS: Washington Street LEETSDALE, PA. 15056
EMERGENCY PHONE NO.: 412-857-4200
CHEMICAL NAME AND SYNONYMS: COPPER
TRADE NAME AND SYNONYMS: (OFHC) (DHP) (ETP) Electrolytic Tough pitch
CDA Alloy 101, 102, 104, 105, 107, 110,* 113,114, 115, 116, 120, 122
* Inclusive Alloy 110 Silver Plate
CHEMICAL FAMILY: COPPER

SECTION II - HAZARDOUS INGREDIENTS

INGREDIENT	PERCENT	CAS NO.	OSHA-PEL/ACGIH-TLV
Base Metal Copper	99.9*	7440-50-8	Exposure Levels See Section V

HAZARDOUS MIXTURES OF OTHERS LIQUIDS, SOLIDS, OR GASES:

If exposure to copper dust/fume are kept below Permissible Exposure Limits (PEL)/
Threshold Limit Value (TLV) all trace elements should not pose any health risk.

* Copper plus silver - All grades of copper covered (including silver bearing -
104, 105, 107, 113, 114, 115, 116) are expected to contain less than .1% silver.

SECTION III - PHYSICAL DATA

MELTING 1949° F
Vapor Pressure (mm Hg.) @ 1628° C - 1 mm
Solubility in Water negligible
Specific Gravity (H₂O = 1) 8.9

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used) Not applicable*

Extinguishing Media Not Applicable

Special Fire Fighting Procedures Not applicable

Unusual Fire and Explosion Hazards Not applicable

0908-2068

TRW-00702

* Under normal conditions. Heavy concentrations of fine copper dust may cause flash fire if exposed to ignition source.

SECTION V – HEALTH HAZARD DATA

EXPOSURE LEVELS: Copper dusts and mists - OSHA (PEL): TWA = 1MG/M³. ACGIH (TLV): TWA = 1 MG/M³.
Copper fume - OSHA (PEL): TWA = 0.1 MG/M³. ACGIH (TLV): TWA = 0.2 MG/M³.

CARCINOGENICITY: Not listed as a carcinogenic in NTP or IARC monographs.

EFFECT OF OVERDOSE: Fume and dust - sneezing, congestion, nausea, metallic taste, chills, fever.

EMERGENCY AND FIRST AID PROCEDURES:
Skin: Flush thoroughly with water. Eyes - flush with water, call Physician.
Ingestion - drink water induce vomiting, call Physician. Inhalation - remove victim to fresh air, call Physician.
Copper fume, dusts and mists are listed by OSHA as air contaminants.

PRIMARY ROUTE(S) OF ENTRY: Inhalation

SECTION VI – REACTIVITY DATA

STABILITY - Stable

INCOMPATIBILITY (material to avoid): (Dust & Fume) acetylene, chlorine

HAZARDOUS DECOMPOSITION PRODUCTS : Copper Fume/dust

HAZARDOUS POLYMERIZATION - Will Not Occur

SECTION VII – SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:

Dust or Fume – wear respirator follow OSHA use instructions, shovel up, or vacuum and place in approved DOT container and seal. Wash contaminated clothing.

WASTE DISPOSAL METHOD:
Dispose of contaminated product and materials used in cleaning up spills or leaks in a manner approved for this material. Follow federal, state and local regulations for disposal.

SECTION VIII – SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify Type) : dust or fume - NIOSH/MSHA approved
dust/fume respirator

VENTILATION - Local Exhaust: dust/fume - if exposure levels exceeded

EYE PROTECTION: (dust) goggles

SECTION IX – SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Avoid breathing dust or fumes. Do not take internally.

TRW-00703

0908-2069



PETERSON STEEL CORPORATION

61 WEST MOUNTAIN ST., WORCESTER, MA 01606 • PHONE Area Code (508) 853-3630

Emergency Phone Number: (508) 853-3630

Issue Date: February 27, 1985

MATERIAL SAFETY DATA SHEET

TRADE NAME (Common or Synonym):
CHEMICAL NAME:

Brass, Bronze, Aluminum Bronze
Copper Base Alloys

1. INGREDIENTS

Material or Compound	CAS Number	% Weight	EXPOSURE LIMITS	
			OSHA PEL (mg/m ³)	ACGIH TLV (mg/m ³)
Aluminum (Al)	7429-90-5	0 - 14	15	5
Antimony (Sb)	7440-36-0	0.8 - 3.0	0.5	0.5
Copper (Cu)	7440-50-8	61 - 85	1	1
Iron (Fe)	7439-89-6	0.01 - 0.04	10	10
Lead (Pb)	7439-92-1	3.0 - 24.5	0.05	0.05
Nickel (Ni)	7440-02-0	0.5 - 1.0	1	1
Tin (Sn)	7440-31-5	4.7 - 14.0	2	2
Zinc (Zn)	7440-66-6	0.5 - 4.0	15	5

NOTE: The above is a summary of the principle elements. Various grades of copper base alloys will contain varying amounts of these elements. Trace elements may also be present in minute amounts.

2. PHYSICAL DATA

Material is (at normal conditions):

- ☐ LIQUID
- ☒ SOLID
- ☐ GAS
- ☐ OTHER

Vapor Density:
N/A

Specific Gravity (H₂O = 1):
Approximately 8

Acidity/Alkalinity
pH - N/A

Solubility In Water (% by Weight):
N/A

Appearance and Odor:
Yellow-Reddish, Odorless

Melting Point (approximate):
1290 - 2260° F

Vapor Pressure (mm Hg @ 20° C):
N/A

% Volatile By Volume:
N/A

Boiling Point:
N/A

3. PERSONAL PROTECTIVE EQUIPMENT

Respiratory Protection:

Appropriate dust/mist/fume respirator should be used to avoid excessive inhalation of particulates. If exposure limits are reached or exceeded, use NIOSH approved equipment.

Eyes and Face:

Safety glasses should be worn when grinding or cutting. Face shields should be worn when welding or cutting.

Hands, Arms and Body:

Protective gloves should be worn as required for welding, burning or handling operations.

Other Clothing and Equipment:

As required depending upon operations and safety codes.

4. EMERGENCY MEDICAL PROCEDURES

Inhalation:

Remove to fresh air; if condition continues, consult a physician.

Eye Contact:

Flush thoroughly with running water to remove particulate; obtain medical attention.

Skin Contact:

Remove particles by washing thoroughly with soap and water. Seek medical attention if condition persists.

Ingestion:

If significant amounts of metal are ingested, consult a physician.

5. HEALTH AND SAFETY INFORMATION

HEALTH

Copper Alloy products in their solid state present no inhalation, ingestion, or contact health hazard. Operations such as burning, welding, sawing, brazing, grinding, and machining, which result in elevating the temperature of the product to or above its melting point, or result in the generation of airborne particulates, may present hazards. The major exposure hazard is inhalation. Effects or overexposure to fume and dust are as follows:

Acute:

Excessive inhalation of metallic fumes and dust may result in irritation of eyes, nose and throat. High concentrations of fumes and dust of iron-oxide, manganese, copper, zinc and lead may result in metal fume fever. Typical symptoms last from 12 to 48 hours and consist of a metallic taste in the mouth, dryness and irritation of the throat, chills and fever.

Chronic:

Chronic and prolonged inhalation of high concentrations of fumes or dust of the following elements may lead to the conditions listed opposite the element:

Aluminum:

May initiate fibrotic changes to lung tissue.

Copper:

No chronic debilitating symptoms indicated.

Iron:

Siderosis, pulmonary effects. No chronic debilitating symptoms indicated.

Lead:

Inhalation of lead particles may result in lead-induced systemic toxicity.

Nickel:

Lesions of the skin and mucous membranes, possible cancer of the nose or lungs-bronchogenic carcinoma.

Tin:

Chronic exposure to tin fumes may cause an apparent benign pneumoconiosis, stannosis.

Zinc:

Gastrointestinal inflammation reported in animal studies.

Medical Conditions Aggravated by Exposure: Individuals with chronic respiratory disorders (i.e.: asthma, chronic bronchitis, emphysema, etc.) may be adversely affected by any fume or airborne particulate matter exposure.

Occupational Exposure Limits: See Products Ingredients Section 1. Chromium and Nickel have been identified by the International Agency for Research on Cancer (IARC) and/or the National Toxicology Program (NTP) as potential cancer causing agents.

FIRE AND EXPLOSION

Flash Point:

N/A

Auto Ignition Temperature:

N/A

Flammable Limits in Air:

Lower: N/A

Upper: N/A

Extinguishing Media:

For molten metal use dry powder or sand.

Extinguishing Media NOT TO BE USED:

Do not use water on molten metal.

Fire and Explosion Hazards:

Copper Alloy products do not present fire or explosion hazards under normal conditions. Fine metal particles such as produced in grinding or sawing can burn. High concentrations of metallic fines in the air may present an explosion hazard.

REACTIVITY

Stability:

● Stable

○ Unstable

Incompatibility (materials to avoid):

Reacts with strong acids to form hydrogen gas.

Conditions to Avoid:

Copper Alloys at temperatures above the melting point may liberate fumes containing oxides of iron and alloying elements. Avoid generation of airborne fume and dust.

Hazardous Decomposition Products:

Metallic dust or fumes may be produced during welding, burning, grinding and possible machining.
Refer to ANSI Z49.1.

6. ENVIRONMENTAL

Spill or Leak Procedures:

Fine turnings and small chips should be swept or vacuumed. Scrap metal can be reclaimed for reuse.

Waste Disposal Method*:

Used or unused product should be disposed of in accordance with Federal State or local laws and regulations.

*Disposer must comply with Federal, State and Local disposal or discharge laws.

7. ADDITIONAL INFORMATION

In welding, precautions should be taken for airborne contaminants which may originate from components of the welding rod.

Arc or spark generated when welding or burning could be a source of ignition for combustion and flammable materials.

TRW-00705

DISCLAIMER

The information in this MSDS was obtained from sources which we believe are reliable. However, the information is provided without any representation or warranty, express or implied, regarding the accuracy or correctness.

The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the product.



OCEAN[®] Network
EMERGENCY PHONE 1-800-OLIN-911

MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS Copper Alloy		
CHEMICAL FAMILY Copper	FORMULA Mixture	TRADE NAME Alloy 197
DESCRIPTION Red orange metallic solid		CAS NO. Not assigned/mixture

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Precautions needed for abrasive, melting or other operations generating a dust or fume. Do not get dust or fume in eyes, on skin or on clothing. Do not take internally. Wash hands with soap and water before eating or smoking. Avoid breathing dust or fumes.	
PROTECTIVE EQUIPMENT Eyes Dust - goggles Gloves Impervious (if necessary) Other NIOSH/MSHA approved high efficiency particulate respirator if excessive dusting/fumes occurs	VENTILATION REQUIREMENTS As required to keep airborne concentrations of copper dust below TLV.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper	Dust 1 mg/m ³	TDLO 120 ug/kg (human)	No data	Inhalation - metal fume fever, respiratory tract irritation

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD Not Applicable	OSHA CLASSIFICATION Non-combustible solid	FLAMMABLE EXPLOSIVE LIMITS	LOWER N/A	UPPER N/A
EXTINGUISHING MEDIA Use extinguishing media suitable for surrounding material.				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved positive pressure self-contained breathing apparatus when any material is involved in a fire.				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE Copper dust 1 mg/m ³ , fume 0.2 mg/m ³ (ACGIH 1985-86)	
SYMPTOMS OF OVER EXPOSURE Dust and fume - sneezing, congestion, metallic taste, nausea, chills, fever	
Dust or fume: Wash with soap and water before eating or smoking. If an irritation develops, call a physician.	
EMERGENCY FIRST-AID PROCEDURES	
EYES	Dust or fume: Flush with water for 15 minutes, call a physician.
INGESTION	Dust: Not a likely route of exposure. If ingested, call a physician.
INHALATION	Dust or fume: Remove victim to fresh air, call a physician.

Chemical

CAS No.

TRW-00706

SECTION VI - TOXICOLOGY (Product)

ACUTE ORAL LD 50		CARCINOGENICITY	Not known to be carcinogenic
ACUTE ORAL TD_{LO}	Copper 120 ug/kg (human)	MUTAGENICITY	Not known to be mutagenic
ACUTE DERMAL LD 50	No data	EYE IRRITATION	Dust is irritating
ACUTE INHALATION LC 50	No data	PRIMARY SKIN IRRITATION	Dust may be irritating
PRINCIPAL ROUTES OF ABSORPTION			
Inhalation of dust or fume			
EFFECTS OF ACUTE EXPOSURE Dust or fume: Skin, eye and mucous membrane irritation, metal fume fever, respiratory tract irritation.			
EFFECTS OF CHRONIC EXPOSURE None expected at industrial use levels. Chronic overexposure may cause liver and kidney effects.			

SECTION VII - SPILL AND LEAKAGE PROCEDURES (Control Procedures)

ACTION FOR MATERIAL RELEASE OR SPILL	
Dust or Fume: Wear NIOSH/MSHA approved high efficiency particulate respirator. Follow OSHA regulations for respirator use (See 29 CFR 1910.134). Wear goggles, coveralls, impervious gloves and boots. Shovel or sweep up and place in an appropriate container. Wash all contaminated clothing before reuse.	
In the event of a large spill, use the emergency telephone number shown on the front of this sheet.	
TRANSPORTATION EMERGENCY, CONTACT CHEMTREC 800-424-9300	
WASTE DISPOSAL METHOD	
Dispose of contaminated product and materials used in cleaning up spills or leaks in a manner approved for this material. Consult appropriate federal, state and local regulatory agencies to ascertain proper disposal procedures.	

SECTION VIII - SHIPPING DATA

D.O.T. CLASS	Not regulated
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SECTION IX - REACTIVITY DATA

STABLE	X UNSTABLE	AT _____ °C _____ °F	HAZARDOUS POLYMERIZATION	MAY OCCUR
				WILL NOT OCCUR X
CONDITIONS TO AVOID		Presence of carbon monoxide during melting		
INCOMPATIBILITY (Material to Avoid)		dust and fume - acetylene, chlorine		
HAZARDOUS DECOMPOSITION PRODUCTS		copper fume		

SECTION X - PHYSICAL DATA

MELTING POINT	No data	VAPOR PRESSURE	N.A.	VOLATILES	N.A.
BOILING POINT	No data	SOLUBILITY IN WATER	Insoluble	EVAPORATION RATE	N.A.
SPECIFIC GRAVITY (H ₂ O = 1)	No data	pH	N.A.	VAPOR DENSITY (Air = 1)	N.A.

INFORMATION FURNISHED BY: Environmental Hygiene
and Toxicology
(203) 789-5436

DATE March 25, 1986

TRW-00707

Department of Environmental Hygiene and Toxicology
(203) 789-5436

Olin CORPORATION

120 Long Ridge Road, Stamford, Connecticut 06904

OCEAN® Network

EMERGENCY PHONE 1-800-OLIN-011

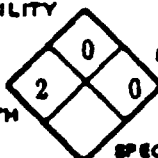
OCEANSM Network

EMERGENCY PHONE (203) 356-2345

Olin Corporation, 120 Long Ridge Road

Stamford, Connecticut 06904

FLAMMABILITY



REACTIVITY

HEALTH

HAZARD RATING

SPECIAL

MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS Copper Alloy		
CHEMICAL FAMILY Copper	FORMULA	TRADE NAME ALLOY B-28
DESCRIPTION Metal		CAS NO.

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Precautions needed for abrasive operations and melting only. Do not get in eyes, on skin or on clothing. Do not take internally. Avoid breathing dust or fumes.	
CORROSIVE ACTION ON MATERIALS (Metals, Plastics, Rubber, Etc.)	
PROTECTIVE EQUIPMENT	VENTILATION REQUIREMENTS
Eyes: Dust and Fume - Goggles Gloves: None necessary Other: None necessary	Dust or fume - Local exhaust or general ventilation required as dictated by airborne concentrations.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROX. %	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper		Dust 1 mg/m ³ Fume 0.1 mg/m ³			Dust and fume - chills, gastro-intestinal distress
Nickel		Dust 1 mg/m ³			Dust or metal - dermatitis

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD Not Applicable	OSHA CLASSIFICATION Not Applicable	FLAMMABLE EXPLOSIVE LIMITS LOWER UPPER
EXTINGUISHING MEDIA Not Applicable		
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved self-contained breathing apparatus where this material is involved in a fire.		

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE None established.	
SYMPTOMS OF OVER EXPOSURE Dust or Fume: Sneezing, congestion, metallic taste, nausea, chills, dermatitis	
EMERGENCY FIRST-AID PROCEDURES	
SKIN Dust or fume: Flush thoroughly with water.	TRW-00708
EYES Dust or fume: Flush with water for 15 minutes, call a physician.	
INGESTION Dust or fume: Drink water, induce vomiting by sticking finger down throat, call a physician.	
INHALATION Dust or fume: Remove victim to fresh air, call a physician.	

0908-2074

Chemical ALLOY B-28

CAS No.

SECTION VI - TOXICOLOGY (Product)

ACUTE ORAL	Lowest Published Lethal Dose - (Copper) 120 mg/kg (human)	CARCINOGENIC	Dust may cause respiratory tract cancer
ACUTE DERMAL LD 50	No available data	MUTAGENIC	Not known to be mutagenic
ACUTE INHALATION LD 50	No available data	EYE IRRITATION	Dust and fume - irritants
		PRIMARY SKIN IRRITATION	Dust is irritant
PRINCIPAL ROUTES OF ABSORPTION			
Inhalation, ingestion of metal, dust or fume			
EFFECTS OF ACUTE EXPOSURE			
Dust or fume: Congestion, gastro-intestinal distress, chills			
EFFECTS OF CHRONIC EXPOSURE			
Dust and fume: May cause kidney, liver or spleen damage, anemia, dermatitis			

SECTION VII - SPILL OR LEAKAGE PROCEDURES (Control Procedures)**STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED**

Dust or fume - Wear NIOSH/MSHA approved dust and fume respirator. Follow OSHA regulations for respirator use. (See 29 CFR 1910.134). Shovel or sweep up and place in an approved DOT container and seal. Wash all contaminated clothing before reuse.

In the event of a large spill use the emergency telephone number shown on the front of this sheet.

WASTE DISPOSAL METHOD

Dispose of contaminated product and materials used in cleaning up spills or leaks in a manner approved for this material. Consult appropriate federal, state and local regulatory agencies to ascertain proper disposal procedures.

SECTION VIII - REACTIVITY DATA

STABLE	X UNSTABLE	AT _____ °C _____ °F	HAZARDOUS POLYMERIZATION	MAY OCCUR
				WILL NOT OCCUR X
CONDITIONS TO AVOID		Presence of carbon monoxide during melting		
INCOMPATIBILITY (MATERIALS TO AVOID)		Dust and fume - acetylene, chloride		
HAZARDOUS DECOMPOSITION PRODUCTS		Copper fume, nickel carbonyl		

SECTION IX - PHYSICAL DATA

MELTING POINT	VAPOR PRESSURE	VOLATILES
BOILING POINT	SOLUBILITY IN WATER	EVAPORATION RATE
SPECIFIC GRAVITY (H ₂ O = 1)	SM	VAPOR DENSITY (AIR = 1)

INFORMATION FURNISHED BY:

UXB
A. L. Gaudreau
(203) 789-5434

DATE October 19, 1984

Department of Environmental Hygiene and Toxicology

Olin CORPORATION
120 Long Ridge Road, Stamford, Connecticut 06904
OCEANSM Network
EMERGENCY PHONE (203) 356-2345

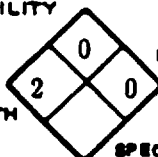
0908-2075

TRW-00709



EMERGENCY PHONE (203) 356-2345
Olin Corporation, 120 Long Ridge Road
Stamford, Conn. 06904

FLAMMABILITY



REACTIVITY

HEALTH

HAZARD RATING

SPECIAL

MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS Copper Alloy		
CHEMICAL FAMILY Copper	FORMULA	TRADE NAME ALLOY B-30
DESCRIPTION Metal	CAS NO.	

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Precautions needed for abrasive operations and melting only. Do not get in eyes, on skin or on clothing. Do not take internally. Avoid breathing dust or fumes.	
CORROSIVE ACTION ON MATERIALS (Metals, Plastic, Rubber, Etc.)	
PROTECTIVE EQUIPMENT	VENTILATION REQUIREMENTS
Eye Dust and Fume - Goggles Gloves None necessary Other None necessary	Dust or fume - Local exhaust or general ventilation required as dictated by airborne concentrations.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROX. %	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper		Dust 1 mg/m ³ Fume 0.1 mg/m ³			Dust and fume - chills, gastro-intestinal distress

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD Not Applicable	OSHA CLASSIFICATION Not Applicable	FLAMMABLE EXPLOSIVE LIMITS	LOWER	UPPER
EXTINGUISHING MEDIA Not Applicable				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved self-contained breathing apparatus where this material is involved in a fire.				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE None established.	
SYMPTOMS OF OVER EXPOSURE Dust or Fume: Sneezing, congestion, metallic taste, nausea, chills	
SKIN Dust or fume: Flush thoroughly with water.	
EYES Dust or fume: Flush with water for 15 minutes, call a physician.	
INGESTION Dust or fume: Drink water, induce vomiting by sticking finger down throat, call a physician.	
INHALATION Dust or fume: Remove victim to fresh air, call a physician.	

TRW-00710

0908-2076

Chemical ALLOY B-30

CAS No.

CHEMICAL NAME ALLOY B-30**SECTION VI - TOXICOLOGY (Product)**

ACUTE ORAL Lowest Published Lethal Dose - (Copper) 120 mg/kg (human)	CARCINOGENIC Not known to be carcinogenic
ACUTE DERMAL LD 50 No available data	MUTAGENIC Not known to be mutagenic
ACUTE INHALATION LC 50 No available data	EYE IRRITATION Dust and fume - irritants
	PRIMARY SKIN IRRITATION Dust is irritant
PRINCIPAL ROUTES OF ABSORPTION Inhalation, ingestion of metal, dust or fume	
EFFECTS OF ACUTE EXPOSURE Dust or fume: Congestion, gastro-intestinal distress, chills	
EFFECTS OF CHRONIC EXPOSURE Dust and fume: May cause kidney, liver or spleen damage, anemia	

SECTION VII - SPILL OR LEAKAGE PROCEDURES (Control Procedures)**STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED**

Dust or fume - Wear NIOSH/MSHA approved dust and fume respirator. Follow OSHA regulations for respirator use. (See 29 CFR 1910.134). Shovel or sweep up and place in an approved DOT container and seal. Wash all contaminated clothing before reuse.

In the event of a large spill use the emergency telephone number shown on the front of this sheet.

WASTE DISPOSAL METHOD

Dispose of contaminated product and materials used in cleaning up spills or leaks in a manner approved for this material. Consult appropriate federal, state and local regulatory agencies to ascertain proper disposal procedures.

SECTION VIII - REACTIVITY DATA

STABLE <input checked="" type="checkbox"/> UNSTABLE <input type="checkbox"/> AT <u> </u> °C <u> </u> °F	HAZARDOUS POLYMERIZATION	MAY OCCUR
		WILL NOT OCCUR <input checked="" type="checkbox"/>
CONDITIONS TO AVOID		
INCOMPATIBILITY (Material To Avoid) Dust and fume - acetylene, chloride		
HAZARDOUS DECOMPOSITION PRODUCTS Copper fume		

SECTION IX - PHYSICAL DATA

MELTING POINT No avail. data	VAPOR PRESSURE	VOLATILES
BOILING POINT	SOLUBILITY IN WATER	EVAPORATION RATE
SPECIFIC GRAVITY (H₂O = 1)	pH	VAPOR DENSITY (Air = 1)
DENSITY No avail. data		

INFORMATION FURNISHED BY:

A. L. Gaudreau
(203) 789-5434

DATE July 9, 1984

Department of Environmental Hygiene and Toxicology



CORPORATION

120 Long Ridge Road, Stamford, Connecticut 06904
EMERGENCY PHONE (203) 356 - 2345

TRW-00711

0908-2077



OCEAN® Network
EMERGENCY PHONE 1-800-OLIN-911

MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS Copper, oxygen free		
CHEMICAL FAMILY Copper	FORMULA Mixture	TRADE NAME Alloy 102
DESCRIPTION Red orange metallic solid		CAS NO. Not assigned/mixture

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Precautions needed for abrasive, melting or other operations generating a dust or fume. Do not get dust or fume in eyes, on skin or on clothing. Do not take internally. Wash thoroughly with soap and water before eating or smoking. Avoid breathing dust or fumes.	
PROTECTIVE EQUIPMENT	VENTILATION REQUIREMENTS
Eyes Goggles Gloves Impervious Other NIOSH/MSHA approved high efficiency particulate respirator if excessive dusting/fumes occurs	As required to keep airborne concentrations of copper below TLV.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper	Dust 1 mg/m ³	TD _{LO} 120 ug/kg (human)	No data	Inhalation - metal fume fever, respiratory tract irritation

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD Not applicable	OSHA CLASSIFICATION Non-combustible solid	FLAMMABLE EXPLOSIVE LIMITS	LOWER N/A	UPPER N/A
EXTINGUISHING MEDIA Use extinguishing media suitable for surrounding materials.				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved positive pressure self-contained breathing apparatus when any material is involved in a fire.				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE Copper; dust - 1 mg/m ³ , fume 0.2 mg/m ³ (ACGIH 1985-86)	
SYMPTOMS OF OVER EXPOSURE Dust and fume: Sneezing, congestion, metallic taste, nausea, chills, fever.	
SKIN	Dust or fume: Wash with soap and water before eating or smoking. If an irritation develops, call a physician.
EYES	Dust or fume: Flush thoroughly with water for 15 minutes. Call a physician.
INGESTION	Dust: Not a likely route of exposure. If ingested, call a physician.
INHALATION	Dust or Fume: Remove victim to fresh air. Call a physician.

Chemical

CAS No.

TRW-00712

0908-2078

SECTION VI - TOXICOLOGY (Product)

ACUTE ORAL LD 50	No data for alloy	CARCINOGENICITY	Not known to be carcinogenic
ACUTE DERMAL LD 50	No data for alloy	MUTAGENICITY	Not known to be mutagenic
ACUTE INHALATION LC 50	No data for alloy	EYE IRRITATION	Dust is irritating
		PRIMARY SKIN IRRITATION	Dust may be an irritant
PRINCIPAL ROUTES OF ABSORPTION			
Inhalation of dust or fume, dermal			
EFFECTS OF ACUTE EXPOSURE Dust or fume: Skin, eye and mucous membrane irritation, metal fume fever, respiratory tract irritation.			
EFFECTS OF CHRONIC EXPOSURE None expected at industrial use levels. Chronic overexposure may cause liver and kidney effects.			

SECTION VII - SPILL AND LEAKAGE PROCEDURES (Control Procedures)

ACTION FOR MATERIAL RELEASE OR SPILL

Dust or Fume: Wear NIOSH/MSHA approved high efficiency particulate respirator. Follow OSHA regulations for respirator use (See 29 CFR 1910.134). Wear goggles, coveralls, impervious gloves and boots. Shovel or sweep up and place in an appropriate container. Wash all contaminated clothing before reuse.

In the event of a large spill, use the emergency telephone number shown on the front of this sheet.

TRANSPORTATION EMERGENCY, CONTACT CHEMTREC 800-424-9300

WASTE DISPOSAL METHOD

Dispose of contaminated product, empty containers and materials used in cleaning up spills or leaks in a manner approved for this material. Consult appropriate federal, state and local regulatory agencies to ascertain proper disposal procedures.

SECTION VIII - SHIPPING DATA

D.O.T. CLASS

Not regulated

SECTION IX - REACTIVITY DATA

STABLE	X UNSTABLE	AT _____ °C _____ °F	HAZARDOUS POLYMERIZATION	MAY OCCUR
				WILL NOT OCCUR X
CONDITIONS TO AVOID Presence of carbon monoxide during melting				
INCOMPATIBILITY (Material to Avoid) dust and fume - acetylene, chlorine				
HAZARDOUS DECOMPOSITION PRODUCTS copper fume				

SECTION X - PHYSICAL DATA

MELTING POINT	1981°F	VAPOR PRESSURE	N/A	VOLATILES	N/A
BOILING POINT	No data	SOLUBILITY IN WATER	Insoluble	EVAPORATION RATE	N/A
SPECIFIC GRAVITY (H ₂ O = 1)	*	pH	N/A	VAPOR DENSITY (Air = 1)	N/A
*DENSITY	.323 pounds/in ³				

INFORMATION FURNISHED BY:

Environmental Hygiene
and Toxicology
(203) 789-5436

DATE

March 27, 1986

TRW-00713

Department of Environmental Hygiene and Toxicology
(203) 789-5436

Olin CORPORATION

120 Long Ridge Road, Stamford, Connecticut 06904

OCEAN® Network

EMERGENCY PHONE



OCEAN® Network
EMERGENCY PHONE 1-800-OLIN-911

MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS BTP Copper, electrolyte tough pitch		
CHEMICAL FAMILY Copper	FORMULA Cu	TRADE NAME Alloy 110
DESCRIPTION Metal		CAS NO. 7440-50-8

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Precautions needed for abrasive, melting or other operations generating a dust or fume. Do not get dust or fume in eyes, on skin or on clothing. Do not take internally. Wash hands with soap and water before eating or smoking. Avoid breathing dust or fumes.	
PROTECTIVE EQUIPMENT Eyes Goggles Gloves Impervious Other NIOSH/MSHA approved high efficiency particulate respirator if excessive dusting/fumes occur.	VENTILATION REQUIREMENTS As required to keep airborne concentrations of copper below TLV.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL		OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper	Dust Fume	1 mg/m ³ 0.1 mg/m ³	TD _{LO} 120 ug/kg (human)	No data	Metal fume fever, respiratory irritation

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD Not Applicable	OSHA CLASSIFICATION Non-combustible	FLAMMABLE EXPLOSIVE LIMITS	LOWER N/A	UPPER N/A
EXTINGUISHING MEDIA Non-combustible - Choose extinguishing media suitable for surrounding materials.				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved positive pressure self-contained breathing apparatus when any material is involved in a fire.				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE Copper, Dust 1 mg/m ³ , Fume 0.2 mg/m ³ (ACGIH 1985-86)	
SYMPTOMS OF OVER EXPOSURE Dust and fume - chills, sneezing, congestion, metallic taste, nausea, fever	
SKIN Dust or fume: Wash with soap and water before eating or smoking. If an irritation develops, call a physician.	EMERGENCY FIRST-AID PROCEDURES
EYES Dust or fume: Flush thoroughly with water for 15 minutes, call a physician	
INGESTION Dust: Not a likely route of exposure. If ingested, call a physician.	
INHALATION Dust or fume: Remove victim to fresh air, call a physician.	

Chemical

CAS No.

0908-2080

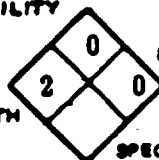
TRW-00714



EMERGENCY PHONE (203) 356-2345

Olin Corporation, 120 Long Ridge Road
Stamford, Conn. 06904

FLAMMABILITY



REACTIVITY

HEALTH

HAZARD RATING

SPECIAL

MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS Silver Bearing Copper, 13 ounce		
CHEMICAL FAMILY Copper	FORMULA	TRADE NAME Alloy 114
DESCRIPTION Metal		CAS NO.

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Avoid breathing dust or fumes. Do not take internally.	
CORROSIVE ACTION ON MATERIALS (Metals, Plastic, Rubber, Etc.)	
PROTECTIVE EQUIPMENT Eyes (Dust) Goggles Gloves Other	VENTILATION REQUIREMENTS As required to keep airborne concentrations below TLV.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROX. %	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper		Dust 1.0 mg/m ³ Fume 0.1 mg/m ³			Gastro-intestinal

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not METHOD Applicable	OSHA CLASSIFICATION	FLAMMABLE EXPLOSIVE LIMITS	LOWER	UPPER
EXTINGUISHING MEDIA Not Applicable				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Not Applicable				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE Copper, dust 1 mg/m ³ , Fume 0.2 mg/m ³ (ACGIH 1983)	
SYMPTOMS OF OVER EXPOSURE Dust and fume, sneezing, congestion, metallic taste, gastro-intestinal distress, chills, fever	
EMERGENCY FIRST-AID PROCEDURES	
SKIN	Flush thoroughly with water.
EYES	Flush with water for 15 minutes, call a physician.
INGESTION	Drink water, induce vomiting by sticking finger down throat, call a physician.
INHALATION	Remove victim to fresh air, call a physician.

TRW-00715

0908-2081

Chemical Alloy 114

CAS No.



OCEAN® Network

EMERGENCY PHONE 1-800-OLIN-911

**MATERIAL
SAFETY DATA****SECTION I - IDENTIFICATION**

CHEMICAL NAME & SYNONYMS Silver Bearing Copper, 25 ounce		
CHEMICAL FAMILY Copper	FORMULA Mixture	TRADE NAME Alloy 116
DESCRIPTION Red orange metallic solid		CAS NO. Not assigned/mixture

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Precautions needed for abrasive, melting or other operations generating a dust or fume. Do not get dust or fume in eyes, on skin or on clothing. Do not take internally. Wash hands with soap and water before eating or smoking. Avoid breathing dust or fumes.	
PROTECTIVE EQUIPMENT	VENTILATION REQUIREMENTS
Eye Dust - goggles Gloves Impervious (if necessary) Other NIOSH/MSHA approved high efficiency particulate respirator if excessive dusting/fumes occurs	As required to keep airborne concentrations of copper dust below TLV.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper	Dust 1 mg/m ³	TDLO 120 ug/kg (human)	No data	Inhalation - metal fume fever, respiratory tract irritation

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD Not Applicable	OSHA CLASSIFICATION Non-combustible solid	FLAMMABLE EXPLOSIVE LIMITS	LOWER N/A	UPPER N/A
EXTINGUISHING MEDIA Use extinguishing media suitable for surrounding material.				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved positive pressure self-contained breathing apparatus when any material is involved in a fire.				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE Copper dust 1 mg/m ³ , fume 0.2 mg/m ³ (ACGIH 1985-86)	
SYMPTOMS OF OVER EXPOSURE Dust and fume - sneezing, congestion, metallic taste, nausea, chills, fever	
SKIN	EMERGENCY FIRST-AID PROCEDURES Dust or fume: Wash with soap and water before eating or smoking. If an irritation develops, call a physician.
EYES	Dust or fume: Flush with water for 15 minutes, call a physician.
INGESTION	Dust: Not a likely route of exposure. If ingested, call a physician.
INHALATION	Dust or fume: Remove victim to fresh air, call a physician.

Chemical

CAS No.

TRW-00716

0908-2082

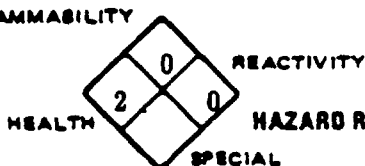


EMERGENCY PHONE (203) 356-2345

Olin Corporation, 120 Long Ridge Road

Stamford, Conn. 06904

FLAMMABILITY



MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS Copper, deoxidized, Low Phosphorous (DLP)		
CHEMICAL FAMILY Copper	FORMULA	TRADE NAME Alloy 120
DESCRIPTION Metal		CAS NO.

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Avoid breathing dust or fumes. Do not take internally.	
CORROSIVE ACTION ON MATERIALS (Metals, Plastic, Rubber, Etc.)	
PROTECTIVE EQUIPMENT Eyes (Dust) Goggles Gloves Other	VENTILATION REQUIREMENTS As required to keep airborne concentrations below TLV.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROX. %	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper		Dust 1.0 mg/m ³ Fume 0.1 mg/m ³			Gastro-intestinal

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not METHOD Applicable	OSHA CLASSIFICATION	FLAMMABLE EXPLOSIVE LIMITS	LOWER	UPPER
EXTINGUISHING MEDIA Not Applicable				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Not Applicable				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE Copper, dust 1 mg/m ³ , Fume 0.2 mg/m ³ (ACGIH 1983)	
SYMPTOMS OF OVER EXPOSURE Dust and fume, sneezing, congestion, metallic taste, gastro-intestinal distress, chills, fever	
EMERGENCY FIRST-AID PROCEDURES	
SKIN	Flush thoroughly with water.
EYES	Flush with water for 15 minutes, call a physician.
INGESTION	Drink water, induce vomiting by sticking finger down throat, call a physician.
INHALATION	Remove victim to fresh air, call a physician.

Chemical Alloy 120

CAS No.

TRW-00717

0908-2083

CHEMICAL NAME Alloy 120

SECTION VI - TOXICOLOGY (Product)

ACUTE ORAL LD 50	CARCINOGENIC	Not known to be carcinogenic
TD _{LO} Copper 120 mg kg (human)	MUTAGENIC	Not known to be mutagenic
ACUTE DERMAL LD 50	EYE IRRITATION	Dust is irritant
ACUTE INHALATION LC 50	PRIMARY SKIN IRRITATION	Dust is irritating
PRINCIPAL ROUTES OF ABSORPTION Inhalation of dust or fume		
EFFECTS OF ACUTE EXPOSURE Congestion, gastro-intestinal distress, chills, fever		
EFFECTS OF CHRONIC EXPOSURE May cause liver, kidney or spleen damage, anemia		

SECTION VII - SPILL OR LEAKAGE PROCEDURES (Control Procedures)

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Dust or fume - Wear NIOSH/MSHA approved dust and fume respirator. Follow OSHA regulations for respirator use. (See 29 CFR 1910.134). Shovel or sweep up and place in an approved DOT container and seal. Wash all contaminated clothing before reuse.
WASTE DISPOSAL METHOD Dispose of contaminated product and materials used in cleaning up spills or leaks in a manner approved for this material. Consult appropriate federal, state and local regulatory agencies to ascertain proper disposal procedures.

SECTION VIII - REACTIVITY DATA

STABLE	UNSTABLE	AT _____ °C _____ °F	HAZARDOUS POLYMERIZATION	MAY OCCUR
				WILL NOT OCCUR X
CONDITIONS TO AVOID				
INCOMPATIBILITY (Materials To Avoid)		Dust and fume - acetylene, chlorine		
HAZARDOUS DECOMPOSITION PRODUCTS		Copper fume		

SECTION IX - PHYSICAL DATA

MELTING POINT	1949°F	VAPOR PRESSURE		VOLATILES
BOILING POINT		SOLUBILITY IN WATER	Insoluble	EVAPORATION RATE
SPECIFIC GRAVITY (H ₂ O = 1)		PH		VAPOR DENSITY (AIR = 1)
DENSITY	.323 pounds/m ³			

INFORMATION FURNISHED BY:

A. L. Gaudreau
(203) 789-5434

DATE

September 4, 1984

Department of Environmental Hygiene and Toxicology



CORPORATION

120 Long Ridge Road, Stamford, Connecticut 06904

EMERGENCY PHONE (203) 356-2345

TRW-00718

0908-2084



EMERGENCY PHONE (203) 356-2345

Olin Corporation, 120 Long Ridge Road
Stamford, Conn. 06904

FLAMMABILITY



REACTIVITY

HEALTH

HAZARD RATING

SPECIAL

MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS Silver Bearing Copper 16 oz		
CHEMICAL FAMILY Copper	FORMULA	TRADE NAME Alloy 129
DESCRIPTION Metal		CAS NO.

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Avoid breathing dust or fumes. Do not take internally.	
CORROSIVE ACTION ON MATERIALS (Metals, Plastic, Rubber, Etc.)	
PROTECTIVE EQUIPMENT	VENTILATION REQUIREMENTS
Eyes: Dust and fume - Goggles Gloves: Dust and fume - Impervious Other: Dust and fume - Coveralls and Impervious Boots	Local exhaust or general ventilation required as dictated by airborne concentrations.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROX. %	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper		Dust 1 mg/m ³ Fume 0.1 mg/m ³			Gastro-intestinal
Arsenic	.012	0.01 mg/m ³	7.8 g/kg (human)		Gastro-intestinal, cancer
Antimony	.003	0.5 mg/m ³	LDLO 15 mg/kg (rat)		Rash, mucous membrane irritation, pneumoconiosis

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not METHOD Applicable	OSHA CLASSIFICATION	FLAMMABLE EXPLOSIVE LIMITS	LOWER	UPPER
EXTINGUISHING MEDIA Not Applicable				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved self-contained breathing apparatus where this material is involved in a fire.				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE None established.	
SYMPTOMS OF OVER EXPOSURE Dust and fume - sneezing, congestion, metallic taste, gastro-intestinal distress, fever, chills.	
EMERGENCY FIRST-AID PROCEDURES	
SKIN	Flush thoroughly with water.
EYES	Flush with water for 15 minutes, call a physician.
INGESTION	Drink water, induce vomiting by sticking finger down throat, call a physician.
INHALATION	Remove victim to fresh air, call a physician.

Chemical

Alloy 129

CAS No.

0908-2085

TRW-00719



OCEAN® Network

EMERGENCY PHONE 1-800-OLIN-911

**MATERIAL
SAFETY DATA****SECTION I - IDENTIFICATION**

CHEMICAL NAME & SYNONYMS ZHC Copper; Zirconium High Copper Alloy		
CHEMICAL FAMILY Copper	FORMULA Mixture	TRADE NAME Alloy 151
DESCRIPTION Metal		CAS NO. Not assigned/mixture

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Precautions needed for abrasive, melting or other operations generating a dust or fume. Do not get dust or fume in eyes, on skin or on clothing. Do not take internally. Wash thoroughly with soap and water before eating or smoking. Avoid breathing dust or fumes.	
PROTECTIVE EQUIPMENT	VENTILATION REQUIREMENTS
Eyes: Dust - Goggles Gloves: Impervious Other: NIOSH/MSHA approved high efficiency particulate respirator if excessive dusting/fumes occur	As required to keep airborne concentrations below TLV for copper and zirconium.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL		OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper	Dust	1 mg/m ³	TD _{LO}	No data	Metal fume fever, respiratory irritation. Presents no hazard because 0.2% maximum of alloy.
	Fume	0.1 mg/m ³	120 ug/kg (human)	No data	
Zirconium		5 mg/m ³	No data	No data	

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD Not applicable	OSHA CLASSIFICATION Non-combustible solid	FLAMMABLE EXPLOSIVE LIMITS	LOWER N/A	UPPER N/A
EXTINGUISHING MEDIA Non-combustible - Choose extinguishing media suitable for surrounding materials.				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved self-contained breathing apparatus where this material is involved in a fire.				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE	None established for mixture (Copper fume - 0.2 mg/m ³ ; Zirconium - 5 mg/m ³ TWA, 10 mg/m ³ STEL ACGIH 1985-86).
SYMPTOMS OF OVER EXPOSURE	Dust and fume - Sneezing, congestion, metallic taste, nausea, chills.
SKIN	Dust or fume: Wash with soap and water before eating or smoking. If an irritation develops, call a physician.
EYES	Dust or fume: Flush thoroughly with water for 15 minutes. Call a physician.
INGESTION	Dust: Not a likely route of exposure. If ingested, call a physician.
INHALATION	Dust or Fume: Remove victim to fresh air. Call a physician.

Chemical

Alloy 151

CAS No.

Not assigned/in

0908-2086

TRW-00720



OCEAN[®] Network
EMERGENCY PHONE 1-800-OLIN-911

MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS HSM Copper		
CHEMICAL FAMILY Copper	FORMULA Mixture	TRADE NAME Alloy 194
DESCRIPTION Metal		CAS NO. Not assigned/mixture

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Precautions needed for abrasive, melting or other operations generating a dust or fume. Do not get dust or fume in eyes, on skin or on clothing. Do not take internally. Wash thoroughly with soap and water before eating or smoking. Avoid breathing dust or fumes.	
PROTECTIVE EQUIPMENT	VENTILATION REQUIREMENTS
Eye Goggles Gloves Other Impervious NIOSH/MSHA approved high efficiency particulate respirator if excessive dusting/fumes occurs	As required to keep airborne concentrations of copper and iron below TLV.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper	Dust 1 mg/m ³	TD _{LO} 120 ug/kg (human)	No data	Inhalation - metal fume fever, respiratory tract irritation
Iron	Fume 10 mg/m ³	No data	No data	Accumulation of dust in lung (siderosis)

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD Not applicable	OSHA CLASSIFICATION Non-combustible solid	FLAMMABLE EXPLOSIVE LIMITS	LOWER N/A	UPPER N/A
EXTINGUISHING MEDIA Use extinguishing media suitable for surrounding materials.				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved positive pressure self-contained breathing apparatus when any material is involved in a fire.				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE	None established for mixture. (Copper; dust - 1 mg/m ³ , fume 0.2 mg/m ³ , Iron oxide fume - 5/mg/m ³ (ACGIH 1985-86)
SYMPTOMS OF OVER EXPOSURE	Dust and fume - Sneezing, congestion, metallic taste, nausea, chills, fever.
SKIN	Dust or fume: Wash with soap and water before eating or smoking. If an irritation develops, call a physician.
EYES	Dust or fume: Flush thoroughly with water for 15 minutes. Call a physician.
INGESTION	Dust: Not a likely route of exposure. If ingested, call a physician.
INHALATION	Dust or Fume: Remove victim to fresh air. Call a physician.

Chemical

CAS No.

0908-2087

TRW-00721



OCEAN® Network
EMERGENCY PHONE 1-800-OLIN-911

MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS Strescon®		
CHEMICAL FAMILY Copper	FORMULA Mixture	TRADE NAME Alloy 195
DESCRIPTION Red orange metallic solid /		CAS NO. Not assigned

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Precautions needed for abrasive, melting or other operations generating a dust or fume. Do not get dust or fume in eyes, on skin or on clothing. Do not take internally. Wash hands with soap and water before eating or smoking. Avoid breathing dust or fumes.	
PROTECTIVE EQUIPMENT	VENTILATION REQUIREMENTS
Eyes Dust - goggles Gloves Impervious (if necessary) Other NIOSH/MSHA approved high efficiency particulate respirator if excessive dusting/fumes occurs	As required to keep airborne concentrations of copper and iron below TLV.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper	Dust 1 mg/m ³	TDLO 120 ug/kg (human)	No data	Inhalation - metal fume fever, respiratory tract irritation
Iron	Fume 10 mg/m ³	No data	No data	Accumulation of dust in lungs (siderosis)

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD Not Applicable	OSHA CLASSIFICATION Non-combustible solid	FLAMMABLE EXPLOSIVE LIMITS	LOWER N/A	UPPER N/A
EXTINGUISHING MEDIA Use extinguishing media suitable for surrounding material				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved self-contained breathing apparatus where this material is involved in a fire.				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE Copper dust 1 mg/m ³ , fume 0.2 mg/m ³ , Iron fume 5 mg/m ³ (ACGIH 1985-86)	
SYMPTOMS OF OVER EXPOSURE Dust and fume - sneezing, congestion, metallic taste, nausea, chills, fever	
Dust or fume: Wash with soap and water before eating or smoking. If an irritation develops, call a physician.	
SKIN	EMERGENCY FIRST-AID PROCEDURES
EYES	Dust or fume: Flush with water for 15 minutes, call a physician.
INGESTION	Dust: Not a likely route of exposure. If ingested, call a physician.
INHALATION	Dust or fume: Remove victim to fresh air, call a physician.

Chemical

CAS No.

TRW-00722

0908-2088



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EMERGENCY PHONE 1-800-OLIN-911

MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS		
Copper Alloy		
CHEMICAL FAMILY	FORMULA	TRADE NAME
Copper	Mixture	Alloy 197
DESCRIPTION		CAS NO.
Red orange metallic solid		Not assigned/mixture

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE	
Precautions needed for abrasive, melting or other operations generating a dust or fume. Do not get dust or fume in eyes, on skin or on clothing. Do not take internally. Wash hands with soap and water before eating or smoking. Avoid breathing dust or fumes.	
PROTECTIVE EQUIPMENT	VENTILATION REQUIREMENTS
Eye: Dust - goggles Gloves: Impervious (if necessary) Other: NIOSH/MSHA approved high efficiency particulate respirator if excessive dusting/fumes occurs	As required to keep airborne concentrations of copper dust below TLV.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper	Dust 1 mg/m ³	TDLO 120 ug/kg (human)	No data	Inhalation - metal fume fever, respiratory tract irritation

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD	OSHA CLASSIFICATION	FLAMMABLE EXPLOSIVE LIMITS	LOWER	UPPER
Not Applicable	Non-combustible solid		N/A	N/A
EXTINGUISHING MEDIA				
Use extinguishing media suitable for surrounding material.				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES				
Use NIOSH/MSHA approved positive pressure self-contained breathing apparatus when any material is involved in a fire.				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE	
Copper dust 1 mg/m ³ , fume 0.2 mg/m ³ (ACGIH 1985-86)	
SYMPTOMS OF OVER EXPOSURE	
Dust and fume - sneezing, congestion, metallic taste, nausea, chills, fever	
EMERGENCY FIRST-AID PROCEDURES	
Dust or fume: Wash with soap and water before eating or smoking. If an irritation develops, call a physician.	
EYES	Dust or fume: Flush with water for 15 minutes, call a physician.
INGESTION	Dust: Not a likely route of exposure. If ingested, call a physician.
INHALATION	Dust or fume: Remove victim to fresh air, call a physician.

Chemical

CAS No.

0908-2089

TRW-00723



OCEAN® Network

EMERGENCY PHONE 1-800-OLIN-911

**MATERIAL
SAFETY DATA****SECTION I - IDENTIFICATION**

CHEMICAL NAME & SYNONYMS Gilding Copper, 95%		
CHEMICAL FAMILY Copper	FORMULA Mixture	TRADE NAME Alloy 210
DESCRIPTION Metal		CAS NO. Not assigned/mixture

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE
Precautions needed for abrasive, melting or other operations generating a dust or fume. Do not get dust or fume in eyes, on skin or on clothing. Do not take internally. Wash thoroughly with soap and water before eating or smoking. Avoid breathing dust or fumes.

PROTECTIVE EQUIPMENT		VENTILATION REQUIREMENTS
Eyes Gloves Other	Goggles Impervious NIOSH/MSHA approved high efficiency particulate respirator if excessive dusting/fumes occur	As required to keep airborne concentrations below TLV for copper and zinc.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper	Dust 1 mg/m ³ Fume 0.1 mg/m ³	TDLO 120 ug/kg (human)	No data	Metal fume fever, respiratory irritation
Zinc	Fume 5 mg/m ³	No data	TCLO 124 mg/m ³ /50 min. (human)	Metal fume fever

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD Not Applicable	OSHA CLASSIFICATION Non-combustible solid	FLAMMABLE EXPLOSIVE LIMITS	LOWER N/A	UPPER N/A
EXTINGUISHING MEDIA Use extinguishing media suitable for surrounding materials.				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved positive pressure self-contained breathing apparatus when any material is involved in a fire.				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE 5 mg/m ³ ACGIH 1985-86).		None established for mixture (copper fume 0.2 mg/m ³ , zinc fume 0.2 mg/m ³).	
SYMPTOMS OF OVER EXPOSURE Dust and fume - sneezing, congestion, metallic taste, nausea, chills, fever.			
SKIN	Dust or fume: Wash with soap and water before eating or smoking. If an irritation develops, call a physician.		
EYES	Dust or fume: Flush thoroughly with water for 15 minutes. Call a physician.		
INGESTION	Dust: Not a likely route of exposure. If ingested, call a physician.		
INHALATION	Dust or Fume: Remove victim to fresh air. Call a physician.		

TRW-0

Chemical

CAS No.

TRW-00724



OCEAN® Network

EMERGENCY PHONE 1-800-OLIN-911

**MATERIAL
SAFETY DATA****SECTION I - IDENTIFICATION**

CHEMICAL NAME & SYNONYMS Commercial bronze		
CHEMICAL FAMILY Copper	FORMULA Mixture	TRADE NAME Alloy 220
DESCRIPTION Metal		CAS NO. Not assigned/mixture

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Precautions needed for abrasive, melting or other operations generating a dust or fume. Do not get dust or fume in eyes, on skin or on clothing. Do not take internally. Wash thoroughly with soap and water before eating or smoking. Avoid breathing dust or fumes.	
PROTECTIVE EQUIPMENT	VENTILATION REQUIREMENTS
Eyes Goggles Gloves Impervious Other NIOSH/MSHA approved high efficiency particulate respirator if excessive dusting/fumes occur	As required to keep airborne concentrations below TLV for copper and zinc.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper	Dust 1 mg/m ³ Fume 0.1 mg/m ³	TD _{LO} 120 ug/kg (human)	No data	Metal fume fever, respiratory irritation
Zinc	Fume 5 mg/m ³	No data	TC _{LO} 124 mg/m ³ /50 min. (human)	Metal fume fever

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD Not Applicable	OSHA CLASSIFICATION Non-combustible solid	FLAMMABLE EXPLOSIVE LIMITS	LOWER N/A	UPPER N/A
EXTINGUISHING MEDIA Use extinguishing media suitable for surrounding materials.				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved positive pressure self-contained breathing apparatus when any material is involved in a fire.				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE 5 mg/m ³ ACGIH 1984).		None established for mixture (copper fume 0.2 mg/m ³ , zinc fume 0.2 mg/m ³).	
SYMPTOMS OF OVER EXPOSURE Dust and fume - sneezing, congestion, metallic taste, nausea, chills, fever.			
SKIN	EMERGENCY FIRST-AID PROCEDURES Dust or fume: Wash with soap and water before eating or smoking. If an irritation develops, call a physician.		
EYES	Dust or fume: Flush thoroughly with water for 15 minutes. Call a physician.		
INGESTION	Dust: Not a likely route of exposure. If ingested, call a physician.		
INHALATION	Dust or Fume: Remove victim to fresh air. Call a physician.		

TRW-00725

TRW-00725

Chemical

Alloy 220

CAS No.

SECTION VI - TOXICOLOGY (Product)

ACUTE ORAL LD 50	No data for alloy	CARCINOGENICITY	Not known to be carcinogenic
ACUTE DERMAL LD 50	No data for alloy	MUTAGENICITY	Not known to be mutagenic
ACUTE INHALATION LC 50	No data for alloy	EYE IRRITATION	Dust is irritating
		PRIMARY SKIN IRRITATION	Dust may be an irritant
PRINCIPAL ROUTES OF ABSORPTION			
Inhalation of dust or fume			
EFFECTS OF ACUTE EXPOSURE			
Metal fume fever (chills, fever, nausea), respiratory irritation			
EFFECTS OF CHRONIC EXPOSURE			
None expected under normal industrial use conditions. Chronic overexposure may cause kidney and liver effects			

SECTION VII - SPILL AND LEAKAGE PROCEDURES (Control Procedures)

ACTION FOR MATERIAL RELEASE OR SPILL

Dust or Fume: Wear NIOSH/MSHA approved high efficiency particulate respirator. Follow OSHA regulations for respirator use (See 29 CFR 1910.134). Wear goggles, coveralls, impervious gloves and boots. Shovel or sweep up and place in an appropriate container. Wash all contaminated clothing before reuse.

In the event of a large spill, use the emergency telephone number shown on the front of this sheet.

TRANSPORTATION EMERGENCY, CONTACT CHEMTREC 800-424-9300

WASTE DISPOSAL METHOD

Dispose of contaminated product, empty containers and materials used in cleaning up spills or leaks in a manner approved for this material. Consult appropriate federal, state and local regulatory agencies to ascertain proper disposal procedures.

SECTION VIII - SHIPPING DATA

D.O.T. CLASS Not regulated

SECTION IX - REACTIVITY DATA

STABLE	X	UNSTABLE	AT	°C	°F	HAZARDOUS POLYMERIZATION	MAY OCCUR
							WILL NOT OCCUR X
CONDITIONS TO AVOID		Presence of carbon monoxide during melting					
INCOMPATIBILITY (Material to Avoid)		(dust and fume) acetylene, chlorine					
HAZARDOUS DECOMPOSITION PRODUCTS		copper fume, zinc oxide fume					

SECTION X - PHYSICAL DATA

MELTING POINT	1870°F	VAPOR PRESSURE	N/A	VOLATILES	N/A
BOILING POINT	No data	SOLUBILITY IN WATER	Insoluble	EVAPORATION RATE	N/A
SPECIFIC GRAVITY (H ₂ O = 1) *		pH	N/A	VAPOR DENSITY (Air = 1)	N/A
*DENSITY	0.318 lbs./in ³				

INFORMATION FURNISHED BY: Environmental Hygiene
and Toxicology
(203) 789-5436

DATE March 31, 1986

TRW-00726

Department of Environmental Hygiene and Toxicology
(203) 789-5436

Olin CORPORATION

120 Long Ridge Road, Stamford, Connecticut 06904

OCEAN® Network

EMERGENCY PHONE 1-800-OLIN-911



OCEAN® Network

EMERGENCY PHONE 1-800-OLIN-911

**MATERIAL
SAFETY DATA****SECTION I - IDENTIFICATION**

CHEMICAL NAME & SYNONYMS Red Brass, 85%		
CHEMICAL FAMILY Copper	FORMULA Mixture	TRADE NAME Alloy 230
DESCRIPTION Metal		CAS NO. Not assigned/mixture

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Precautions needed for abrasive, melting or other operations generating a dust or fume. Do not get dust or fume in eyes, on skin or on clothing. Do not take internally. Wash thoroughly with soap and water before eating or smoking. Avoid breathing dust or fumes.	
PROTECTIVE EQUIPMENT	VENTILATION REQUIREMENTS
Eyes Goggles Gloves Impervious Other NIOSH/MSHA approved high efficiency particulate respirator if excessive dusting/fumes occur	As required to keep airborne concentrations below TLV for copper and zinc.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper	Dust 1 mg/m ³ Fume 0.1 mg/m ³	TD _{LO} 120 ug/kg (human)	No data	Metal fume fever, respiratory irritation
Zinc	Fume 5 mg/m ³	No data	TC _{LO} 124 mg/m ³ /50 min. (human)	Metal fume fever

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD Not Applicable	OSHA CLASSIFICATION Non-combustible solid	FLAMMABLE EXPLOSIVE LIMITS	LOWER N/A	UPPER N/A
EXTINGUISHING MEDIA Use extinguishing media suitable for surrounding materials.				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved positive pressure self-contained breathing apparatus when any material is involved in a fire.				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE		None established for mixture (copper fume 0.2 mg/m ³ , zinc fume 0.1 mg/m ³).
5 mg/m ³ ACGIH 1984).		
SYMPTOMS OF OVER EXPOSURE		
Dust and fume - sneezing, congestion, metallic taste, nausea, chills, fever.		
EMERGENCY FIRST-AID PROCEDURES		
SKIN	Dust or fume: Wash with soap and water before eating or smoking. If an irritation develops, call a physician.	
EYES	Dust or fume: Flush with water for 15 minutes. Call a physician.	
INGESTION	Dust: Not a likely route of exposure. If ingested, call a physician.	0908-20
INHALATION	Dust or Fume: Remove victim to fresh air. Call a physician.	TRW-00

Chemical Alloy 230

CAS No.

0908-2093

TRW-00727



OCEAN® Network
EMERGENCY PHONE 1-800-OLIN-911

MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS Low Brass		
CHEMICAL FAMILY Copper	FORMULA Mixture	TRADE NAME Alloy 240
DESCRIPTION Metal		CAS NO. Not assigned/Mixture

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE
Precautions needed for abrasive, melting or other operations generating a dust or fume. Do not get dust or fume in eyes, on skin, or on clothing. Do not take internally. Wash thoroughly with soap and water before eating or smoking. Avoid breathing dust or fumes.

PROTECTIVE EQUIPMENT	VENTILATION REQUIREMENTS
Eyes Goggles Gloves Impervious Other NIOSH/MSHA approved high efficiency particulate respirator if excessive dusting/fumes occur	As required to keep airborne concentrations below TLV for copper and zinc.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper Dust Fume	1 mg/m ³ 0.1 mg/m ³	TD _{LO} = 120 µg/kg (human)	No data	Metal fume fever, respiratory irritation
Zinc Fume	5 mg/m ³	No data	TC _{LO} 124 mg/m ³ / 50 min. (human)	Metal fume fever

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD Not Applicable	OSHA CLASSIFICATION Non-combustible solid	FLAMMABLE EXPLOSIVE LIMITS	LOWER N/A	UPPER N/A
EXTINGUISHING MEDIA Use extinguishing media suitable for surrounding materials.				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved positive pressure self-contained breathing apparatus when any material is involved in a fire.				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE 5 mg/m ³ , ACGIH 1985-86).	None established for mixture (copper fume 0.2 mg/m ³ , zinc fume 0.2 mg/m ³ , ACGIH 1985-86).
SYMPTOMS OF OVER EXPOSURE Dust and fume - sneezing, congestion, metallic taste, nausea, chills, fever	
SKIN Dust or fume: Wash with soap and water before eating or smoking. If an irritation develops, call a physician.	EMERGENCY FIRST-AID PROCEDURES
EYES Dust or fume: Flush thoroughly with water for 15 minutes, call a physician.	
INGESTION Dust: Not a likely route of exposure. If ingested, call a physician.	
INHALATION Dust or fume: Remove victim to fresh air, call a physician.	

Chemical

CAS No.

0908-2094

TRW-00728



OCEAN® Network
EMERGENCY PHONE 1-800-OLIN-911

MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS Yellow brass, cartridge brass		
CHEMICAL FAMILY Copper	FORMULA Mixture	TRADE NAME Alloy 260
DESCRIPTION Metal		CAS NO. Not assigned/mixture

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Precautions needed for abrasive, melting or other operations generating a dust or fume. Do not get dust or fume in eyes, on skin or on clothing. Do not take internally. Wash thoroughly with soap and water before eating or smoking. Avoid breathing dust or fumes.		
PROTECTIVE EQUIPMENT		VENTILATION REQUIREMENTS
Eyes Goggles Gloves Impervious Other NIOSH/MSHA approved high efficiency particulate respirator if excessive dusting/fumes occur	As required to keep airborne concentrations below TLV for copper and zinc.	

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper	Dust 1 mg/m ³ Fume 0.1 mg/m ³	TDLO 120 ug/kg (human)	No data	Metal fume fever, respiratory irritation
Zinc	Fume 5 mg/m ³	No data	TCLO ₃ 124 mg/m ³ /50 min. (human)	Metal fume fever

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD Not Applicable	OSHA CLASSIFICATION Non-combustible solid	FLAMMABLE EXPLOSIVE LIMITS	LOWER N/A	UPPER N/A
EXTINGUISHING MEDIA Use extinguishing media suitable for surrounding materials.				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved positive pressure self-contained breathing apparatus when any material is involved in a fire.				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE 5 mg/m ³ ACGIH 1985-86). None established for mixture (copper fume 0.2 mg/m ³ , zinc fume 0.2 mg/m ³)	
SYMPTOMS OF OVER EXPOSURE Dust and fume - sneezing, congestion, metallic taste, nausea, chills, fever.	
SKIN Dust or fume: Wash with soap and water before eating or smoking. If an irritation develops, call a physician.	
EYES Dust or fume: Flush with water for 15 minutes. Call a physician.	
INGESTION Dust: Not a likely route of exposure. If ingested, call a physician.	
INHALATION Dust or Fume: Remove victim to fresh air. Call a physician.	

Chemical

Alloy 260

CAS No.

0908-2095

TRW-00729

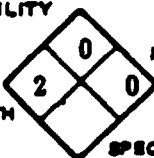


EMERGENCY PHONE (203) 356-2345

Olin Corporation, 120 Long Ridge Road
Stamford, Conn. 06904

FLAMMABILITY

HEALTH



REACTIVITY

HAZARD RATING

SPECIAL

MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS Yellow brass		
CHEMICAL FAMILY Copper	FORMULA	TRADE NAME Alloy 262
DESCRIPTION Metal		CAS NO.

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Avoid breathing dust or fumes. Do not take internally.	
CORROSIVE ACTION ON MATERIALS (Metals, Plastics, Rubber, Etc.)	
PROTECTIVE EQUIPMENT	VENTILATION REQUIREMENTS
Eyes Dust - goggles Gloves Other	As required to keep airborne concentrations of copper dust below TLV.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROX. %	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper		Dust 1 mg/m ³ Fume 0.1 mg/m ³			Gastro-intestinal
Zinc		Fume 5 mg/m ³	LDLO 500 mg/kg (human)	TCLO 600 mg/m ³ (human)	Metal fume fever

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD Not Applicable	OSHA CLASSIFICATION	FLAMMABLE EXPLOSIVE LIMITS	LOWER	UPPER
EXTINGUISHING MEDIA Not Applicable				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Not Applicable				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE None established.	
SYMPTOMS OF OVER EXPOSURE Dust and fume - sneezing, congestion, metallic taste, nausea, chills, fever	
EMERGENCY FIRST-AID PROCEDURES	
SKIN	Flush thoroughly with water.
EYES	Flush with water for 15 minutes, call a physician.
INGESTION	Drink water, induce vomiting by sticking finger down throat, call a physician.
INHALATION	Remove victim to fresh air, call a physician.

Chemical Alloy 262

CAS No.

TRW-00730

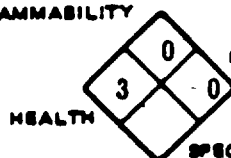
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EMERGENCY PHONE (203) 356-2345

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Stamford, Conn. 06904

FLAMMABILITY



REACTIVITY

HAZARD RATING

SPECIAL

MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS Medium Leaded Brass		
CHEMICAL FAMILY Copper	FORMULA	TRADE NAME Alloy 350
DESCRIPTION Metal		CAS NO.

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Avoid breathing dust or fumes. Do not take internally.	
CORROSIVE ACTION ON MATERIALS (Metals, Plastics, Rubber, Etc.)	
PROTECTIVE EQUIPMENT	VENTILATION REQUIREMENTS
Eyes: Dust - goggles Gloves: Other:	Local exhaust or general ventilation required as dictated by airborne concentrations.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROX. %	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper		Dust 1 mg/m ³ Fume 0.1 mg/m ³			Gastro-intestinal
Zinc		Fume 5 mg/m ³	LDLO 500 mg/m ³ human		Metal fume fever
Lead	0.8-1.4	0.05 mg/m ³	LDLO 450 mg/m ³ human		Central nervous system, fetal damage

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD: Not Applicable	OSHA CLASSIFICATION	FLAMMABLE EXPLOSIVE LIMITS	LOWER	UPPER
EXTINGUISHING MEDIA Not Applicable				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved self-contained breathing apparatus where this material is involved in a fire.				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE None established.	
SYMPTOMS OF OVER EXPOSURE Dust and fume - sneezing, congestion, metallic taste, chills, nausea, fever.	
EMERGENCY FIRST-AID PROCEDURES	
SKIN	Flush thoroughly with water.
EYES	Flush with water for 15 minutes, call a physician.
INGESTION	Drink water, induce vomiting by sticking finger down throat, call a physician.
INHALATION	Remove victim to fresh air, call a physician.

Chemical

Alloy 350

CAS No.

TRW-00731

0908-2097

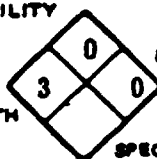
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EMERGENCY PHONE (203) 358-2345

Olin Corporation, 120 Long Ridge Road

Stamford, Connecticut 06904

FLAMMABILITY



REACTIVITY

HAZARD RATING

SPECIAL

MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS		
High Leaded Brass		
CHEMICAL FAMILY	FORMULA	TRADE NAME
Copper		Alloy 353
DESCRIPTION	CAS NO.	
Metal		

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE	
Avoid breathing dust or fumes. Do not take internally.	
CORROSIVE ACTION ON MATERIALS (Metals, Plastic, Rubber, Etc.)	
PROTECTIVE EQUIPMENT	VENTILATION REQUIREMENTS
Eyes Dust - goggles Gloves Other	Local exhaust or general ventilation required as dictated by airborne concentrations.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROX. %	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper		Dust 1 mg/m ³ Fume 0.1 mg/m ³			Gastro-intestinal
Zinc		Fume 5 mg/m ³	LD ₅₀ 500 mg/m ³ human		Metal fume fever
Lead	1.3-2.3	0.05 mg/m ³	TD ₅₀ 450 mg/m ³ human		Central nervous system, fetal damage

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	Not	OSHA CLASSIFICATION	FLAMMABLE EXPLOSIVE LIMITS	LOWER	UPPER
METHOD	Applicable				
EXTINGUISHING MEDIA					
Not Applicable					
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES					
Use NIOSH/MSHA approved self-contained breathing apparatus where this material is involved in a fire.					

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE	
None established.	
SYMPTOMS OF OVER EXPOSURE	
Dust and fume - sneezing, congestion, metallic taste, chills, nausea, fever.	
EMERGENCY FIRST-AID PROCEDURES	
SKIN	Flush thoroughly with water.
EYES	Flush with water for 15 minutes, call a physician.
INGESTION	Drink water, induce vomiting by sticking finger down throat, call a physician.
INHALATION	Remove victim to fresh air, call a physician.

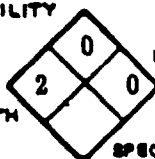
Chemical Alloy 353

CAS No.



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Stamford, Conn. 06904

FLAMMABILITY



REACTIVITY

HEALTH

HAZARD RATING

SPECIAL

MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS High Conductivity Bronze		
CHEMICAL FAMILY Copper	FORMULA	TRADE NAME Alloy 405
DESCRIPTION Metal	CAS NO.	

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Avoid breathing dust or fumes. Do not take internally.	
CORROSIVE ACTION ON MATERIALS (Metals, Plastic, Rubber, Etc.)	
PROTECTIVE EQUIPMENT Eyes Dust - goggles Gloves Other	VENTILATION REQUIREMENTS As required to keep airborne concentrations of copper dust below TLV.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROX. %	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper		Dust 1 mg/m ³ Fume 0.1 mg/m ³			Gastro-intestinal
Zinc		Fume 5 mg/m ³	LD ₅₀ 500 mg/kg human	TC ₅₀ 600 mg/m ³	Metal fume fever
Cobalt		Dust 2 mg/m ³		human	Mucous membrane irritation

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT NOT METHOD Applicable	OSHA CLASSIFICATION	FLAMMABLE EXPLOSIVE LIMITS	LOWER	UPPER
EXTINGUISHING MEDIA Not Applicable				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Not Applicable				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE None established.	
SYMPTOMS OF OVER EXPOSURE Dust and fume - sneezing, congestion, metallic taste, gastro-intestinal distress, chills, fever	
EMERGENCY FIRST-AID PROCEDURES	
SKIN Flush thoroughly with water.	TRW-00733
EYES Flush with water for 15 minutes, call a physician.	
INGESTION Drink water, induce vomiting by sticking finger down throat, call a physician.	
INHALATION Remove victim to fresh air, call a physician.	

Chemical

Alloy 405

CAS No.



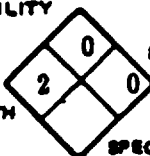
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FLAMMABILITY



REACTIVITY

HEALTH

HAZARD RATING

SPECIAL

MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS Lubaloy		
CHEMICAL FAMILY Copper	FORMULA	TRADE NAME Alloy 411
DESCRIPTION Metal		CAS NO.

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Avoid breathing dust or fumes. Do not take internally.	
CORROSIVE ACTION ON MATERIALS (Metals, Plastic, Rubber, Etc.)	
PROTECTIVE EQUIPMENT	VENTILATION REQUIREMENTS
Eyes Dust - goggles Gloves Other	As required to keep airborne concentrations of copper dust below TLV.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROX. %	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper		Dust 1 mg/m ³ Fume 0.1 mg/m ³			Gastro-intestinal
Zinc		Fume 5 mg/m ³	LDLO 500 mg/kg human	TCLO 600 mg/m ³ human	Metal fume fever
Cobalt		Dust 2 mg/m ³			Mucous membrane irritation

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not METHOD Applicable	OSHA CLASSIFICATION	FLAMMABLE EXPLOSIVE LIMITS	LOWER	UPPER
EXTINGUISHING MEDIA Not Applicable				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Not Applicable				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE None established.	
SYMPTOMS OF OVER EXPOSURE Dust and fume - sneezing, congestion, metallic taste, gastro-intestinal distress, chills, fever	
EMERGENCY FIRST-AID PROCEDURES	
SKIN	Flush thoroughly with water.
EYES	Flush with water for 15 minutes, call a physician.
INGESTION	Drink water, induce vomiting by sticking finger down throat, call a physician.
INHALATION	Remove victim to fresh air, call a physician.

Chemical Alloy 411

CAS No.

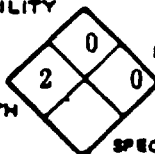
TRW-00734

0908-2100



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FLAMMABILITY



REACTIVITY

HEALTH

HAZARD RATING

SPECIAL

MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS Copper Alloy		
CHEMICAL FAMILY Copper	FORMULA	TRADE NAME Alloy 413
DESCRIPTION Metal		CAS NO.

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Avoid breathing dust or fumes. Do not take internally.	
CORROSIVE ACTION ON MATERIALS (Metals, Plastic, Rubber, Etc.)	
PROTECTIVE EQUIPMENT	VENTILATION REQUIREMENTS
Eyes Dust - goggles Gloves Other	As required to keep airborne concentrations of copper dust below TLV.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROX. %	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper		Dust 1 mg/m ³ Fume 0.1 mg/m ³			Gastro-intestinal
Zinc		Fume 5 mg/m ³	LDLO 500 mg/kg human	TCLO 600 mg/m ³ human	Metal fume fever
Cobalt		Dust 2 mg/m ³			Mucous membrane irritation

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not METHOD Applicable	OSHA CLASSIFICATION	FLAMMABLE EXPLOSIVE LIMITS	LOWER	UPPER
EXTINGUISHING MEDIA Not Applicable				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Not Applicable				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE None established.	
SYMPTOMS OF OVER EXPOSURE Dust and fume - sneezing, congestion, metallic taste, gastro-intestinal distress, chills, fever	
EMERGENCY FIRST-AID PROCEDURES	
SKIN	Flush thoroughly with water.
EYES	Flush with water for 15 minutes, call a physician.
INGESTION	Drink water, induce vomiting by sticking finger down throat, call a physician.
INHALATION	Remove victim to fresh air, call a physician.

Chemical Alloy 413

CAS No.

TRW-00735

CHEMICAL NAME Alloy 413

SECTION VI - TOXICOLOGY (Product)

ACUTE ORAL LD 50		CARCINOGENIC	Not known to be carcinogenic
ACUTE ORAL TD _{LO}	Copper 120 mg/kg	MUTAGENIC	Not known to be mutagenic
ACUTE DERMAL LD 50	(human)	EYE IRRITATION	Dust is irritant
ACUTE INHALATION LD 50		PRIMARY SKIN IRRITATION	Dust is irritant
PRINCIPAL ROUTES OF ABSORPTION Inhalation of dust or fume			
EFFECTS OF ACUTE EXPOSURE Congestion, gastro-intestinal distress, chills, fever, dermatitis			
EFFECTS OF CHRONIC EXPOSURE May cause liver, kidney or spleen damage, anemia, dermatitis			

SECTION VII - SPILL OR LEAKAGE PROCEDURES (Control Procedures)

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Dust or fume - Wear NIOSH/MSHA approved dust and fume respirator. Follow OSHA regulations for respirator use. (See 29 CFR 1910.134). Shovel or sweep up and place in an approved DOT container and seal. Wash all contaminated clothing before reuse.
WASTE DISPOSAL METHOD Dispose of contaminated product and materials used in cleaning up spills or leaks in a manner approved for this material. Consult appropriate federal, state and local regulatory agencies to ascertain proper disposal procedures.

SECTION VIII - REACTIVITY DATA

STABLE	X UNSTABLE	AT _____ °C _____ °F	HAZARDOUS POLYMERIZATION	MAY OCCUR
				WILL NOT OCCUR X
CONDITIONS TO AVOID				
INCOMPATIBILITY (Reagents To Avoid)		Dust and fume - acetylene, chlorine		
HAZARDOUS DECOMPOSITION PRODUCTS		Copper fume, zinc oxide fume		

SECTION IX - PHYSICAL DATA

MELTING POINT	1850°F	VAPOR PRESSURE		VOLATILES
BOILING POINT		SOLUBILITY IN WATER	Insoluble	EVAPORATION RATE
SPECIFIC GRAVITY (H ₂ O = 1)		DH		VAPOR DENSITY (Air = 1)
DENSITY	.318 pounds/m ³			

INFORMATION FURNISHED BY:

 A. L. Gaudreau
 (203) 789-5434

DATE

September 4, 1984

Department of Environmental Hygiene and Toxicology

 Olin CORPORATION

 120 Long Ridge Road, Stamford, Connecticut 06904
 EMERGENCY PHONE (203) 356 - 2345

TRW-00736

0908-2102

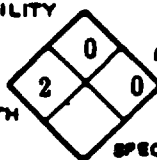


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FLAMMABILITY



REACTIVITY

HEALTH

HAZARD RATING

SPECIAL

MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS Lubaloy X		
CHEMICAL FAMILY Copper	FORMULA	TRADE NAME Alloy 425
DESCRIPTION Metal		CAS NO.

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Avoid breathing dust or fumes. Do not take internally.	
CORROSIVE ACTION ON MATERIALS (Metals, Plastic, Rubber, Etc.)	
PROTECTIVE EQUIPMENT	VENTILATION REQUIREMENTS
Eyes Dust - goggles Gloves Other	As required to keep airborne concentrations of copper dust below TLV.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROX. %	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper		Dust 1 mg/m ³ Fume 0.1 mg/m ³			Gastro-intestinal
Zinc		Fume 5 mg/m ³	LDLO 500 mg/kg	TCLO 600 mg/m ³	Metal fume fever
Cobalt		Dust 2 mg/m ³	human	human	Mucous membrane irritation

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not Applicable	OSHA CLASSIFICATION	FLAMMABLE EXPLOSIVE LIMITS	LOWER	UPPER
EXTINGUISHING MEDIA Not Applicable				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Not Applicable				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE None established.	
SYMPTOMS OF OVER EXPOSURE Dust and fume - sneezing, congestion, metallic taste, gastro-intestinal distress, chills, fever	
EMERGENCY FIRST-AID PROCEDURES	
SKIN	Flush thoroughly with water.
EYES	Flush with water for 15 minutes, call a physician.
INGESTION	Drink water, induce vomiting by sticking finger down throat, call a physician.
INHALATION	Remove victim to fresh air, call a physician.

Chemical Alloy 425

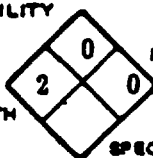
CAS No.

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Stamford, Connecticut 06904

FLAMMABILITY



REACTIVITY

HAZARD RATING

SPECIAL

MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS Lubronze		
CHEMICAL FAMILY Copper	FORMULA	TRADE NAME Alloy 422
DESCRIPTION Metal	CAS NO.	

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Avoid breathing dust or fumes. Do not take internally.	
CORROSIVE ACTION ON MATERIALS (Metals, Plastic, Rubber, Etc.)	
PROTECTIVE EQUIPMENT	VENTILATION REQUIREMENTS
Eyes Dust - goggles Gloves Other	As required to keep airborne concentrations of copper dust below TLV.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROX. %	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper		Dust 1 mg/m ³ Fume 0.1 mg/m ³			Gastro-intestinal
Zinc		Fume 5 mg/m ³	LDLO 500 mg/kg	TCLO 600 mg/m ³	Metal fume fever
Cobalt		Dust 2 mg/m ³	human	human	Mucous membrane irritation

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT NOT METHOD Applicable	OSHA CLASSIFICATION	FLAMMABLE EXPLOSIVE LIMITS	LOWER	UPPER
EXTINGUISHING MEDIA Not Applicable				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Not Applicable				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE None established.	
SYMPTOMS OF OVER EXPOSURE Dust and fume - sneezing, congestion, metallic taste, gastro-intestinal distress, chills, fever	
EMERGENCY FIRST-AID PROCEDURES	
SKIN	Flush thoroughly with water.
EYES	Flush with water for 15 minutes, call a physician.
INGESTION	Drink water, induce vomiting by sticking finger down throat, call a physician.
INHALATION	Remove victim to fresh air, call a physician.

Chemical Alloy 422

CAS No.

TRW-00738

0908-2104

olin MATERIAL SAFETY DATA
 OCEAN® Network
 EMERGENCY PHONE 1-800-OLIN-911

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS Phosphor Bronze 1.25%		
CHEMICAL FAMILY Copper	FORMULA Mixture	TRADE NAME Alloy 505
DESCRIPTION Metal	CAS NO. Not assigned/Mixture	

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Precautions needed for abrasive, melting or other operations generating a dust or fume. Do not get dust or fume in eyes, on skin, or on clothing. Do not take internally. Wash thoroughly with soap and water before eating or smoking. Avoid breathing dust or fumes.	
PROTECTIVE EQUIPMENT	VENTILATION REQUIREMENTS
Eyes Goggles Gloves Impervious Other NIOSH/MSHA approved high efficiency particulate respirator if excessive dusting/fumes occur	As required to keep airborne concentrations below TLV for copper and tin.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL		OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper	Dust Fume	1 mg/m ³ 0.1 mg/m ³	TD _{LO} = 120 ug/kg (human)	No data	Inhalation - metal fume fever, respiratory tract irritation
Tin	Dust	2 mg/m ³	No data	No data	Mucous membrane irritation, accumulation of dust in lung (pneumoconiosis)

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD Not Applicable	OSHA CLASSIFICATION Non-combustible solid	FLAMMABLE EXPLOSIVE LIMITS	LOWER N/A	UPPER N/A
EXTINGUISHING MEDIA Use extinguishing media suitable for surrounding materials.				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved positive pressure self-contained breathing apparatus when any material is involved in a fire.				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE None established for mixture (copper fume 0.2 mg/m ³ , tin 2 mg/m ³ , ACGIH 1985-86).	
SYMPTOMS OF OVER EXPOSURE Dust and fume - sneezing, congestion, metallic taste, nausea, chills, fever	
SKIN	Dust or fume: Wash with soap and water before eating or smoking. If an irritation develops, call a physician.
EYES	Dust or fume: Flush thoroughly with water for 15 minutes, call a physician.
INGESTION	Dust: Not a likely route of exposure. If ingested, call a physician.
INHALATION	Dust or fume: Remove victim to fresh air, call a physician.

Chemical

CAS No.

TRW-00739



OCEAN® Network

EMERGENCY PHONE 1-800-OLIN-911

**MATERIAL
SAFETY DATA****SECTION I - IDENTIFICATION**

CHEMICAL NAME & SYNONYMS Phosphor Bronze 5% A		
CHEMICAL FAMILY Copper	FORMULA Mixture	TRADE NAME Alloy 510
DESCRIPTION Metal		CAS NO. Not assigned/mixture

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Precautions needed for abrasive, melting or other operations generating a dust or fume. Do not get dust or fume in eyes, on skin or on clothing. Do not take internally. Wash thoroughly with soap and water before eating or smoking. Avoid breathing dust or fumes.	
PROTECTIVE EQUIPMENT	VENTILATION REQUIREMENTS
Eyes Goggles Gloves Other Impervious NIOSH/MSHA approved high efficiency particulate respirator if excessive dusting/fumes occur	As required to keep airborne concentrations below TLV for copper and tin.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper	Dust 1 mg/m ³ Fume 0.1 mg/m ³	TDLO = 120 ug/kg (human)	No data	Dust or fume: metal fume fever, respiratory irritation
Tin	Dust 2 mg/m ³	No data	No data	Mucous membrane irritation, accumulation of dust in lung (pneumoconiosis)

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD Not applicable	OSHA CLASSIFICATION Non-combustible solid	FLAMMABLE EXPLOSIVE LIMITS	LOWER N/A	UPPER N/A
EXTINGUISHING MEDIA Use extinguishing media suitable for surrounding materials.				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved positive pressure self-contained breathing apparatus when any material is involved in a fire.				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE None established for mixture (copper fume 0.2 mg/m ³ , tin 2 mg/m ³ ACGIH 1985-86).	
SYMPTOMS OF OVER EXPOSURE Dust and fume - sneezing, congestion, metallic taste, nausea	
SKIN	DUST or fume: Wash with soap and water before eating or smoking. If an irritation develops, call a physician.
EYES	Dust or fume: Flush with water for 15 minutes. Call a physician.
INGESTION	Dust: Not a likely route of exposure. If ingested, call a physician.
INHALATION	Dust or Fume: Remove victim to fresh air. Call a physician.

Chemical

CAS No.

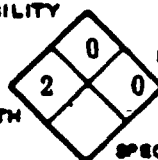
TRW-00740



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FLAMMABILITY



REACTIVITY

HEALTH

HAZARD RATING

SPECIAL

MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS Phosphor Bronze		
CHEMICAL FAMILY Copper	FORMULA	TRADE NAME Alloy 511
DESCRIPTION Metal		CAS NO.

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Avoid breathing dust or fumes. Do not take internally.	
CORROSIVE ACTION ON MATERIALS (Metals, Plastic, Rubber, Etc.)	
PROTECTIVE EQUIPMENT Eyes Dust - goggles Gloves Other	VENTILATION REQUIREMENTS As required to keep airborne concentrations of copper dust below TLV.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROX. %	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper		Dust 1 mg/m ³ Fume 0.1 mg/m ³			Gastro-intestinal
Tin		Dust 2 mg/m ³			Mucous membrane irritation

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not METHOD Applicable	OSHA CLASSIFICATION	FLAMMABLE EXPLOSIVE LIMITS	LOWER	UPPER
EXTINGUISHING MEDIA Not Applicable				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Not Applicable				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE None established.	
SYMPTOMS OF OVER EXPOSURE Dust and fume - sneezing, congestion, metallic taste, gastro-intestinal distress, chills, fever	
EMERGENCY FIRST-AID PROCEDURES	
SKIN	Flush thoroughly with water.
EYES	Flush with water for 15 minutes, call a physician.
INGESTION	Drink water, induce vomiting by sticking finger down throat, call a physician.
INHALATION	Remove victim to fresh air, call a physician.

TRW-00741

0908-2107

Chemical

Alloy 511

CAS No.



OCEAN® Network

EMERGENCY PHONE 1-800-OLIN-911

MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS Phosphor Bronze, 8%		
CHEMICAL FAMILY Copper	FORMULA Mixture	TRADE NAME Alloy 521
DESCRIPTION Metal		CAS NO. Not assigned/mixture

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Precautions needed for abrasive, melting or other operations generating a dust or fume. Do not get dust or fume in eyes, on skin or on clothing. Do not take internally. Wash thoroughly with soap and water before eating or smoking. Avoid breathing dust or fumes.	
PROTECTIVE EQUIPMENT	VENTILATION REQUIREMENTS
Eyes Goggles Gloves Impervious Other NIOSH/MSHA approved high efficiency particulate respirator if excessive dusting/fumes occur	As required to keep airborne concentrations below TLV for copper and tin.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper	Dust 1 mg/m ³ Fume 0.1 mg/m ³	TDLO = 120 ug/kg (human)	No data	Inhalation - metal fume fever, respiratory tract irritation
Tin	Dust 2 mg/m ³	No data	No data	Mucous membrane irritation, accumulation of dust in lung (pneumoconiosis)

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD Not applicable	OSHA CLASSIFICATION Non-combustible solid	FLAMMABLE EXPLOSIVE LIMITS	LOWER N/A	UPPER N/A
EXTINGUISHING MEDIA Use extinguishing media suitable for surrounding materials.				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved positive pressure self-contained breathing apparatus when any material is involved in a fire.				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE None established for mixture (copper fume 0.2 mg/m ³ , tin 2 mg/m ³ ACGIH 1985-86).	
SYMPTOMS OF OVER EXPOSURE Dust and fume - sneezing, congestion, metallic taste, nausea, chills, fever	
SKIN	Dust or fume: Wash with soap and water before eating or smoking. If an irritation develops, call a physician.
EYES	Dust or fume: Flush thoroughly with water for 15 minutes. Call a physician.
INGESTION	Dust: Not a likely route of exposure. If ingested, call a physician.
INHALATION	Dust or Fume: Remove victim to fresh air. Call a physician.

Chemical

CAS No.

0908-2108

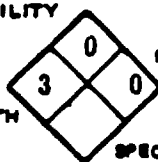
TRW-00742



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Stamford, Conn. 06904

FLAMMABILITY



REACTIVITY

HEALTH

HAZARD RATING

SPECIAL

MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS Leaded Bearing Bronze		
CHEMICAL FAMILY Copper	FORMULA	TRADE NAME Alloy 544
DESCRIPTION Metal		CAS NO.

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Avoid breathing dust or fumes. Do not take internally.	
CORROSIVE ACTION ON MATERIALS (Metals, Plastic, Rubber, Etc.)	
PROTECTIVE EQUIPMENT	VENTILATION REQUIREMENTS
Eye Dust - goggles Gloves Other	Local exhaust or general ventilation required as dictated by airborne concentrations.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROX. %	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper		Dust 1 mg/m ³ Fume 0.1 mg/m ³			Gastro-intestinal
Zinc		Fume 5 mg/m ³	LDLO 500 mg/m ³ human		Metal fume fever
Lead	3.5-4.5	0.05 mg/m ³	TDLO 450 mg/m ³ human		Central nervous system, fetal damage

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not METHOD Applicable	OSHA CLASSIFICATION	FLAMMABLE EXPLOSIVE LIMITS	LOWER	UPPER
EXTINGUISHING MEDIA Not Applicable				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved self-contained breathing apparatus where this material is involved in a fire.				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE None established.	
SYMPTOMS OF OVER EXPOSURE Dust and fume - sneezing, congestion, metallic taste, chills, nausea, fever.	
EMERGENCY FIRST-AID PROCEDURES	
SKIN Flush thoroughly with water.	TRW-00743
EYES Flush with water for 15 minutes, call a physician.	
INGESTION Drink water, induce vomiting by sticking finger down throat, call a physician.	
INHALATION Remove victim to fresh air, call a physician.	

0908-2109

Chemical

CAS NO.



OCEAN® Network
EMERGENCY PHONE 1-800-OLIN-911

MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS Coronze®, Aluminum Bronze		
CHEMICAL FAMILY Copper	FORMULA Mixture	TRADE NAME Alloy 638
DESCRIPTION Red orange metallic solid		CAS NO. Not assigned/mixture

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Precautions needed for abrasive, melting or other operations generating a dust or fume. Do not get dust or fume in eyes, on skin or on clothing. Do not take internally. Wash hands with soap and water before eating or smoking. Avoid breathing dust or fumes.	
PROTECTIVE EQUIPMENT	VENTILATION REQUIREMENTS
Eyes Dust - goggles Gloves Impervious (if necessary) Other NIOSH/MSHA approved high efficiency particulate respirator if excessive dusting/fumes occurs	As required to keep airborne concentrations of copper and aluminum below TLV.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL		OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper	Dust Fume	1 mg/m ³ 0.1 mg/m ³	TDLO 120 ug/kg (human)	No data	Inhalation - metal fume fever, respiratory tract irritation
Aluminum		None Established	No data	No data	Over-exposure may cause lung fibrosis (Shaver's Disease)

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD Not Applicable	OSHA CLASSIFICATION Non-combustible solid	FLAMMABLE EXPLOSIVE LIMITS	LOWER N/A	UPPER N/A
EXTINGUISHING MEDIA Use extinguishing media suitable for surrounding material.				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved positive pressure self-contained breathing apparatus when any material is involved in a fire.				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE Copper dust 1 mg/m ³ , fume 0.2 mg/m ³ , Aluminum 10 mg/m ³ (ACGIH 1985-86)	
SYMPTOMS OF OVER EXPOSURE Dust and fume - sneezing, congestion, metallic taste, nausea, chills, fever	
SKIN	EMERGENCY FIRST-AID PROCEDURES Dust or fume: Wash with soap and water before eating or smoking. If an irritation develops, call a physician.
EYES	Dust or fume: Flush with water for 15 minutes, call a physician.
INGESTION	Dust: Not a likely route of exposure. If ingested, call a physician.
INHALATION	Dust or fume: Remove victim to fresh air, call a physician.

Chemical

CAS No.

TRW-00744



OCEAN® Network

EMERGENCY PHONE 1-800-OLIN-911

**MATERIAL
SAFETY DATA****SECTION I - IDENTIFICATION**

CHEMICAL NAME & SYNONYMS Ultronze™		
CHEMICAL FAMILY Copper	FORMULA Mixture	TRADE NAME Alloy 654
DESCRIPTION Metal		CAS NO. Not assigned/mixture

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Precautions needed for abrasive, melting or other operations generating a dust or fume. Do not get dust or fume in eyes, on skin or on clothing. Do not take internally. Wash thoroughly with soap and water before eating or smoking. Avoid breathing dust or fumes.	
PROTECTIVE EQUIPMENT	VENTILATION REQUIREMENTS
Eyes Goggles Gloves Impervious Other NIOSH/MSHA approved high efficiency particulate respirator if excessive dusting/fumes occur	As required to keep airborne concentrations below the TLV for copper, chromium and tin.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL		OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper	Dust	1 mg/m ³	TD _{LO} =120 ug/kg (human)	No data	Metal fume fever, respiratory irritation
	Fume	0.1 mg/m ³			
Chromium (.01-.12%)		1 mg/m ³	No data	No data	Dermatitis, suspect carcinogen
Tin	Dust	2 mg/m ³	No data	No data	Mucous membrane irritant, accumulation of dust in lung (pneumoconiosis)

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD Not Applicable	OSHA CLASSIFICATION Non-combustible solid	FLAMMABLE EXPLOSIVE LIMITS	LOWER N/A	UPPER N/A
EXTINGUISHING MEDIA Use extinguishing media suitable for surrounding materials.				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved positive pressure self-contained breathing apparatus where any material is involved in a fire.				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE None established for mixture. (Copper fume 0.2 mg/m ³ , tin 2 mg/m ³ , chromium 0.5 mg/m ³ , ACGIH 1985-86)	
SYMPTOMS OF OVER EXPOSURE Dust and fume - sneezing, congestion, metallic taste, nausea, chills, fever.	
EMERGENCY FIRST-AID PROCEDURES	
SKIN	Dust or Fume: Wash with soap and water before eating or drinking. If an irritation develops, call a physician.
EYES	Dust or Fume: Flush with water for 15 minutes, call a physician.
INGESTION	Dust: Not a likely route of exposure. If ingested, call a physician.
INHALATION	Dust or Fume: Remove victim to fresh air, call a physician.

Chemical

CAS No.

0908-2111

TRW-00745



OCEAN® Network
EMERGENCY PHONE 1-800-OLIN-911

MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS CoBron® Iron Modified Brass		
CHEMICAL FAMILY Copper	FORMULA Mixture	TRADE NAME Alloy 664
DESCRIPTION Metallic	CAS NO. Not assigned/mixture	

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Precautions needed for abrasive, melting or other operations generating a dust or fume. Do not get dust or fume in eyes, on skin or on clothing. Do not take internally. Wash thoroughly with soap and water before eating or smoking. Avoid breathing dust or fumes.	
PROTECTIVE EQUIPMENT Eyes Goggles Gloves Impervious Other NIOSH/MSHA approved high efficiency particulate respirator if excessive dusting/fumes occur	VENTILATION REQUIREMENTS Local exhaust or general ventilation required as dictated by airborne concentrations.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper	Dust 1 mg/m ³ Fume 0.1 mg/m ³	TDLO 120 ug/kg (human)	No data	Metal fume fever, respirator irritation
Zinc	Fume 5 mg/m ³	No data	TCLO ₃ 124 mg/m ³ /50 (min) human	Metal fume fever
Iron	Fume 10 mg/m ³	No data	No data	Accumulation of dust in lung (siderosis)

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD Not Applicable	OSHA CLASSIFICATION Non-combustible	FLAMMABLE EXPLOSIVE LIMITS	LOWER N/A	UPPER N/A
EXTINGUISHING MEDIA Non-combustible - choose extinguishing media suitable for surrounding materials.				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved self-contained breathing apparatus where this material is involved in a fire.				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE None established for mixture. (Copper 1 mg/m ³ , Zinc 5 mg/m ³ , Iron 5 mg/m ³ ACGIH 1985-86).	
SYMPTOMS OF OVER EXPOSURE Dust and fume - sneezing, congestion, metallic taste, nausea, chills, fever.	
SKIN Dust or fume: Wash with soap and water before eating or smoking. If an irritation develops, call a physician.	EMERGENCY FIRST-AID PROCEDURES
EYES Dust or fume: Flush thoroughly with water for 15 minutes, call a physician.	
INGESTION Dust: Not a likely route of exposure. If ingested, call a physician.	
INHALATION Dust or fume: Remove victim to fresh air. Call a physician.	

Chemical

CAS No.

0908-2112

TRW-00746



OCEAN[®] Network
EMERGENCY PHONE 1-800-OLIN-911

MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS Alcoloy [®]		
CHEMICAL FAMILY Copper	FORMULA Mixture	TRADE NAME Alloy 688
DESCRIPTION Metallic		CAS NO. Not assigned/mixture

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Precautions needed for abrasive, melting or other operations generating a dust or fume. Do not get dust or fume in eyes, on skin or on clothing. Do not take internally. Upon contact with skin or eyes, wash off with water. Avoid breathing dust or fumes.	
PROTECTIVE EQUIPMENT Eyes Goggles Gloves Impervious Other NIOSH/MSHA approved high efficiency particulate respirator if excessive dusting/fumes occur	VENTILATION REQUIREMENTS As required to keep airborne concentrations below the TLV for copper, and aluminum.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper	Dust 1 mg/m ³ Fume 0.1 mg/m ³	LD ₅₀ =120 ug/kg (human)	No data	Metal fume fever, respiratory irritation
Zinc	Fume 5 mg/m ³	No data	No data	Metal fume fever
Aluminum	None established	No data	No data	Lung fibrosis (Shaver's disease)

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD Not Applicable	OSHA CLASSIFICATION Non-combustible solid	FLAMMABLE EXPLOSIVE LIMITS	LOWER -	UPPER -
EXTINGUISHING MEDIA Use extinguishing media suitable for surrounding materials.				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved positive pressure self-contained breathing apparatus where any material is involved in a fire.				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE None established for mixture. (Copper fume - 0.2 mg/m ³ , zinc fume - 5 mg/m ³ , Aluminum - 10 mg/m ³ ACGIH 1985 - 86)	
SYMPTOMS OF OVER EXPOSURE Dust and fume - sneezing, congestion, metallic taste, nausea, chills, fever.	
EMERGENCY FIRST-AID PROCEDURES SKIN Dust or Fume: Flush thoroughly with water. If an irritation develops, call a physician.	
EYES Dust or Fume: Flush with water for 15 minutes, call a physician.	
INGESTION Dust: If ingested, call a physician.	
INHALATION Dust or Fume: Remove victim to fresh air, call a physician.	

0908-2113

TRW-00747

Chemical

CAS No.



OCEAN® Network
EMERGENCY PHONE 1-800-OLIN-911

MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS Cupro Nickel 10%		
CHEMICAL FAMILY Copper	FORMULA Mixture	TRADE NAME Alloy 706
DESCRIPTION Metal		CAS NO. Not assigned/mixture

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Precautions needed for abrasive, melting or other operations generating a dust or fume. Do not get dust or fume in eyes, on skin or on clothing. Do not take internally. Wash thoroughly with soap and water before eating or smoking. Avoid breathing dust or fumes.		
PROTECTIVE EQUIPMENT		VENTILATION REQUIREMENTS
Eyes	Dust - goggles	As required to keep airborne concentrations below TLV for copper and nickel.
Gloves	Impervious	
Other	NIOSH/MSHA approved high efficiency particulate respirator if excessive dusting/fumes occur	

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL		OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper	Dust	1 mg/m ³	TD _{LO}	No data	Metal fume fever, respiratory irritation
	Fume	0.1 mg/m ³	120 ug/kg (human)		
Nickel	Dust	1 mg/m ³	LD _{LO} 5 mg/kg (guinea pig)	No data	Dermatitis, suspect carcinogen

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD Not Applicable	OSHA CLASSIFICATION Non-combustible solid	FLAMMABLE EXPLOSIVE LIMITS	LOWER N/A	UPPER N/A
EXTINGUISHING MEDIA Non-combustible - Choose extinguishing media suitable for surrounding materials.				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved self-contained breathing apparatus where this material is involved in a fire.				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE None established for mixture (Copper fume 0.2 mg/m ³ , Nickel dust 1.0 mg/m ³ ACGIH 1985-86).	
SYMPTOMS OF OVER EXPOSURE Dust and fume - sneezing, congestion, metallic taste, nausea, chills, dermatitis	
SKIN	Dust or fume: Wash with soap and water before eating or smoking. EMERGENCY FIRST-AID PROCEDURES If an irritation develops, call a physician.
EYES	Dust or fume: Flush with water for 15 minutes. Call a physician.
INGESTION	Dust: Not a likely route of exposure. If ingested, call a physician.
INHALATION	Dust or Fume: Remove victim to fresh air. Call a physician.

TRW-00748

0908-2114

Chemical

Alloy 706

CAS NO.

SECTION VI - TOXICOLOGY (Product)

ACUTE ORAL LD 50	No data for alloy	CARCINOGENICITY	Nickel is considered a carcinogen (NTP)
ACUTE DERMAL LD 50	No data for alloy	MUTAGENICITY	Not known to be mutagenic
ACUTE INHALATION LC 50	No data for alloy	EYE IRRITATION	Dust is an irritant
		PRIMARY SKIN IRRITATION	Dust may be an irritant
PRINCIPAL ROUTES OF ABSORPTION			
Inhalation, dermal exposure to metal dust or fume			
EFFECTS OF ACUTE EXPOSURE Dust or fume: Metal fume fever, respiratory irritation, skin, eye and mucous membrane irritation.			
EFFECTS OF CHRONIC EXPOSURE Dermatitis. Chronic over-exposure may cause kidney and liver effects. Nickel has been associated with lung cancers.			

SECTION VII - SPILL AND LEAKAGE PROCEDURES (Control Procedures)

ACTION FOR MATERIAL RELEASE OR SPILL

Dust or fume - Wear NIOSH/MSHA approved high efficiency particulate respirator. Follow OSHA regulations for respirator use. (See 29 CFR 1910.134). Wear goggles, coveralls, impervious gloves and boots. Shovel or sweep up and place in an appropriate container. Wash all contaminated clothing before reuse.

In the event of a large spill, use the emergency telephone number shown on the front of this sheet.

TRANSPORTATION EMERGENCY, CONTACT CHEMTREC 800-424-9300

WASTE DISPOSAL METHOD

Dispose of contaminated product and materials used in cleaning up spills or leaks in a manner approved for this material. Consult appropriate federal, state and local regulatory agencies to ascertain proper disposal procedures.

SECTION VIII - SHIPPING DATA

D.O.T. CLASS

Not regulated

SECTION IX - REACTIVITY DATA

STABLE	X	UNSTABLE	AT	°C	°F	HAZARDOUS POLYMERIZATION	MAY OCCUR
							WILL NOT OCCUR X
CONDITIONS TO AVOID Carbon monoxide during melting							
INCOMPATIBILITY (Material to Avoid) Dust and fume - acetylene, chlorine							
HAZARDOUS DECOMPOSITION PRODUCTS Copper fume, nickel carbonyl							

SECTION X - PHYSICAL DATA

MELTING POINT	2010°F	VAPOR PRESSURE	N/A	VOLATILES	N/A
BOILING POINT	No data	SOLUBILITY IN WATER	Insoluble	EVAPORATION RATE	N/A
SPECIFIC GRAVITY (H ₂ O = 1) *		pH	N/A	VAPOR DENSITY (Air = 1)	N/A
*DENSITY	.323 pounds/in ³				

INFORMATION FURNISHED BY: Environmental Hygiene and Toxicology
(203) 789-5436

DATE March 31, 1986

TRW-00749

Department of Environmental Hygiene and Toxicology
(203) 789-5436

Olin CORPORATION

120 Long Ridge Road, Stamford, Connecticut 06904

OCEAN® Network

EMERGENCY PHONE 1-800-OLIN-911

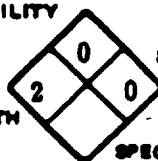
OCEANSM Network

EMERGENCY PHONE (203) 356-2345

Olin Corporation, 120 Long Ridge Road

Stamford, Connecticut 06904

FLAMMABILITY



REACTIVITY

HEALTH

HAZARD RATING

SPECIAL

MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS Copper Nickel 15%		
CHEMICAL FAMILY Copper	FORMULA	TRADE NAME ALLOY 709
DESCRIPTION Metal	CAS NO.	

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Precautions needed for abrasive operations and melting only. Do not get in eyes, on skin or on clothing. Do not take internally. Avoid breathing dust or fumes.	
CORROSIVE ACTION ON MATERIALS (Metals, Plastics, Rubber, Etc.)	
PROTECTIVE EQUIPMENT	VENTILATION REQUIREMENTS
Eyes Dust and Fume - Goggles Gloves None necessary Other None necessary	Dust or fume - Local exhaust or general ventilation required as dictated by airborne concentrations.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROX. %	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper		Dust 1 mg/m ³ Fume 0.1 mg/m ³			Dust and fume - chills, gastro-intestinal distress
Nickel		Dust 1 mg/m ³			Dust or metal - dermatitis

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD Not Applicable	OSHA CLASSIFICATION Not Applicable	FLAMMABLE EXPLOSIVE LIMITS	LOWER	UPPER
EXTINGUISHING MEDIA Not Applicable				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved self-contained breathing apparatus where this material is involved in a fire.				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE None established.	
SYMPTOMS OF OVER EXPOSURE Dust or Fume: Sneezing, congestion, metallic taste, nausea, chills, dermatitis	
SKIN	Dust or fume: Flush thoroughly with water. EMERGENCY FIRST-AID PROCEDURES
EYES	Dust or fume: Flush with water for 15 minutes, call a physician.
INGESTION	Dust or fume: Drink water, induce vomiting by sticking finger down throat, call a physician.
INHALATION	Dust or fume: Remove victim to fresh air, call a physician.

Chemical ALLOY 709

CAS No.

TRW-00750

0908-2116



OCEAN® Network
EMERGENCY PHONE 1-800-OLIN-911

MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS		
Copper Nickel 20%		
CHEMICAL FAMILY	FORMULA	TRADE NAME
Copper	Mixture	ALLOY 710
DESCRIPTION	CAS NO.	
Metal	Not assigned/mixture	

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE	
Precautions needed for abrasive, melting or other operations generating a dust or fume. Do not get dust or fume in eyes, on skin or on clothing. Do not take internally. Wash thoroughly with soap and water before eating or smoking. Avoid breathing dust or fumes.	
PROTECTIVE EQUIPMENT	VENTILATION REQUIREMENTS
Eyes Goggles Gloves Impervious Other NIOSH/MSHA approved high efficiency particulate respirator if excessive dusting/fumes occur	As required to keep airborne concentrations below the TLV for copper, zinc and nickel.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL		OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper	Dust	1 mg/m ³	TD _{LO}	No data	Metal fume fever, respiratory irritation
	Fume	0.1 mg/m ³	120 ug/kg (human)	No data	
Zinc	Fume	5 mg/m ³	No data	TC _{LO} 124 mg/m ³ /50 min.(hum.)	Metal fume fever
Nickel	Dust	1 mg/m ³	No data	No data	Dermatitis, suspect carcinogen

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD	OSHA CLASSIFICATION	FLAMMABLE EXPLOSIVE LIMITS	LOWER	UPPER
Not Applicable	Non-combustible solid		N/A	N/A
EXTINGUISHING MEDIA				
Use extinguishing media suitable for surrounding materials.				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES				
Use NIOSH/MSHA approved positive pressure self-contained breathing apparatus when any material is involved in a fire.				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE	
None established for mixture (copper fume 0.2 mg/m ³ , zinc fume 5 mg/m ³ , nickel 1 mg/m ³ ACGIH 1985-86).	
SYMPTOMS OF OVER EXPOSURE	
Dust and fume - sneezing, congestion, metallic taste, nausea, chills, fever, dermatitis.	
EMERGENCY FIRST-AID PROCEDURES	
SKIN	Dust or fume: Wash with soap and water before eating or smoking. If an irritation develops, call a physician.
EYES	Dust or fume: Flush thoroughly with water for 15 minutes. Call a physician.
INGESTION	Dust: Not a likely route of exposure. If ingested, call a physician.
INHALATION	Dust or Fume: Remove victim to fresh air. Call a physician.

TRW-00751

SECTION VI - TOXICOLOGY (Product)

ACUTE ORAL LD 50	No data for alloy	CARCINOGENICITY	Nickel is considered carcinogenic
ACUTE DERMAL LD 50	No data for alloy	MUTAGENICITY	Not known to be mutagenic (NTP)
ACUTE INHALATION LC 50	No data for alloy	EYE IRRITATION	Dust is irritating
		PRIMARY SKIN IRRITATION	Dust may be an irritant
PRINCIPAL ROUTES OF ABSORPTION Inhalation of dust or fume			
EFFECTS OF ACUTE EXPOSURE Metal fume fever (chills, fever, nausea), respiratory irritation, skin eye, mucous membrane irritation.			
EFFECTS OF CHRONIC EXPOSURE None expected under normal industrial use conditions. Chronic overexposure may cause kidney and liver effects. Nickel has been associated with lung cancer.			

SECTION VII - SPILL AND LEAKAGE PROCEDURES (Control Procedures)

ACTION FOR MATERIAL RELEASE OR SPILL

Dust or Fume: Wear NIOSH/MSHA approved high efficiency particulate respirator. Follow OSHA regulations for respirator use (See 29 CFR 1910.134). Wear goggles, coveralls, impervious gloves and boots. Shovel or sweep up and place in an appropriate container. Wash all contaminated clothing before reuse.

In the event of a large spill, use the emergency telephone number shown on the front of this sheet.

TRANSPORTATION EMERGENCY, CONTACT CHEMTREC 800-424-9300

WASTE DISPOSAL METHOD

Dispose of contaminated product, empty containers and materials used in cleaning up spills or leaks in a manner approved for this material. Consult appropriate federal, state and local regulatory agencies to ascertain proper disposal procedures.

SECTION VIII - SHIPPING DATA

D.O.T. CLASS

Not regulated

SECTION IX - REACTIVITY DATA

STABLE	X UNSTABLE	AT	°C	°F	HAZARDOUS POLYMERIZATION	MAY OCCUR
						WILL NOT OCCUR X
CONDITIONS TO AVOID Presence of carbon monoxide during melting						
INCOMPATIBILITY (Material to Avoid) (dust and fume) acetylene, chlorine						
HAZARDOUS DECOMPOSITION PRODUCTS copper fume, zinc oxide fume, nickel carbonyl						

SECTION X - PHYSICAL DATA

MELTING POINT	2100°F	VAPOR PRESSURE	N/A	VOLATILES	N/A
BOILING POINT	No data	SOLUBILITY IN WATER	Insoluble	EVAPORATION RATE	N/A
SPECIFIC GRAVITY (H ₂ O = 1)	*	pH	N/A	VAPOR DENSITY (Air = 1)	N/A
*DENSITY .323 lbs./in ³					

INFORMATION FURNISHED BY:

Environmental Hygiene
and Toxicology
(203) 789-5436

DATE

March 20, 1986

TRW-00752

Department of Environmental Hygiene and Toxicology
(203) 789-5436

Olin CORPORATION

120 Long Ridge Road, Stamford, Connecticut 06904

OCEAN® Network

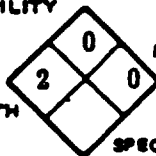
EMERGENCY PHONE 1-800-OLIN-911

OCEANSM Network

EMERGENCY PHONE (203) 356-2345

Olin Corporation, 120 Long Ridge Road
Stamford, Connecticut 06904

FLAMMABILITY



REACTIVITY

HEALTH

HAZARD RATING

SPECIAL

MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS Copper Nickel 25%		
CHEMICAL FAMILY Copper	FORMULA	TRADE NAME ALLOY 713
DESCRIPTION Metal		CAS NO.

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Precautions needed for abrasive operations and melting only. Do not get in eyes, on skin or on clothing. Do not take internally. Avoid breathing dust or fumes.	
CORROSIVE ACTION ON MATERIALS (Metals, Plastic, Rubber, Etc.)	
PROTECTIVE EQUIPMENT	VENTILATION REQUIREMENTS
Eyes Dust and Fume - Goggles Gloves None necessary Other None necessary	Dust or fume - Local exhaust or general ventilation required as dictated by airborne concentrations.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROX. %	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper		Dust 1 mg/m ³ Fume 0.1 mg/m ³			Dust and fume - chills, gastro-intestinal distress
Nickel		Dust 1 mg/m ³			Dust or metal - dermatitis

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD Not Applicable	OSHA CLASSIFICATION Not Applicable	FLAMMABLE EXPLOSIVE LIMITS	LOWER	UPPER
EXTINGUISHING MEDIA Not Applicable				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved self-contained breathing apparatus where this material is involved in a fire.				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE None established.	
SYMPTOMS OF OVER EXPOSURE Dust or Fume: Sneezing, congestion, metallic taste, nausea, chills, dermatitis	
EMERGENCY FIRST-AID PROCEDURES	
SKIN Dust or fume: Flush thoroughly with water.	
EYES Dust or fume: Flush with water for 15 minutes, call a physician.	
INGESTION Dust or fume: Drink water, induce vomiting by sticking finger down throat, call a physician.	
INHALATION Dust or fume: Remove victim to fresh air, call a physician.	

TRW-00753

0908-2119

Chemical ALLOY 713

CAS No.



OCEAN® Network

EMERGENCY PHONE 1-800-OLIN-911

**MATERIAL
SAFETY DATA****SECTION I - IDENTIFICATION**

CHEMICAL NAME & SYNONYMS Cupro Nickel 30%		
CHEMICAL FAMILY Copper	FORMULA Mixture	TRADE NAME Alloy 715
DESCRIPTION Metal		CAS NO. Not assigned/mixture

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Precautions needed for abrasive, melting or other operations generating a dust or fume. Do not get dust or fume in eyes, on skin or on clothing. Do not take internally. Wash thoroughly with soap and water before eating or smoking. Avoid breathing dust or fumes.	
PROTECTIVE EQUIPMENT	VENTILATION REQUIREMENTS
Eyes Goggles Gloves Impervious Other NIOSH/MSHA approved high efficiency particulate respirator if excessive dusting/fumes occur	As required to keep airborne concentrations below the TLV for copper and nickel.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL		OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper	Dust	1 mg/m ³	TD _{LO} = 120 ug/kg (human)	No data	Dust and fume-metal fume fever, respiratory irritation
	Fume	0.1 mg/m ³			
Nickel	Dust	1 mg/m ³	LD _{LO} = 5 mg/kg (guinea pig)	No data	Dust or metal-dermatitis, suspect carcinogen

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD Not Applicable	OSHA CLASSIFICATION Non-combustible solid	FLAMMABLE EXPLOSIVE LIMITS	LOWER N/A	UPPER N/A
EXTINGUISHING MEDIA Use extinguishing media suitable for surrounding materials.				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved positive pressure self-contained breathing apparatus where any material is involved in a fire.				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE	None established for mixture (Copper fume - 0.2 mg/m ³ , Nickel - 1 mg/m ³ ACGIH 1984).
SYMPTOMS OF OVER EXPOSURE	Dust or Fume: Sneezing, congestion, metallic taste, nausea, chills, dermatitis
SKIN	Dust or fume: Wash with soap and water before eating or smoking. EMERGENCY FIRST-AID PROCEDURES If an irritation develops, call a physician.
EYES	Dust or fume: Flush with water for 15 minutes, call a physician.
INGESTION	Dust: Not a likely route of exposure. If ingested, call a physician.
INHALATION	Dust or Fume: Remove victim to fresh air, call a physician.

Chemical

Alloy 715

CAS No.

0908-2120

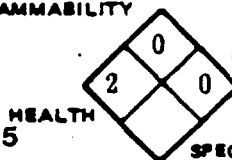
TRW-00754

OCEANSM Network

EMERGENCY PHONE (203) 356-2345

Olin Corporation, 120 Long Ridge Road
Stamford, Connecticut 06904

FLAMMABILITY



REACTIVITY

HAZARD RATING

SPECIAL

MATERIAL
SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS Copper Alloy		
CHEMICAL FAMILY Copper	FORMULA	TRADE NAME ALLOY 724
DESCRIPTION Metal		CAS NO.

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Precautions needed for abrasive operations and melting only. Do not get in eyes, on skin or on clothing. Do not take internally. Avoid breathing dust or fumes.	
CORROSIVE ACTION ON MATERIALS (Metals, Plastic, Rubber, Etc.)	
PROTECTIVE EQUIPMENT	VENTILATION REQUIREMENTS
Eye Dust and Fume - Goggles Gloves None necessary Other None necessary	Dust or fume - Local exhaust or general ventilation required as dictated by airborne concentrations.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROX. %	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper		Dust 1 mg/m ³ Fume 0.1 mg/m ³			Dust and fume - chills, gastro-intestinal distress
Nickel		Dust 1 mg/m ³			Dust or metal - dermatitis

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD Not Applicable	OSHA CLASSIFICATION Not Applicable	FLAMMABLE EXPLOSIVE LIMITS	LOWER	UPPER
EXTINGUISHING MEDIA Not Applicable				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved self-contained breathing apparatus where this material is involved in a fire				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE None established.	
SYMPTOMS OF OVER EXPOSURE Dust or Fume: Sneezing, congestion, metallic taste, nausea, chills, dermatitis	
EMERGENCY FIRST-AID PROCEDURES	
SKIN Dust or fume: Flush thoroughly with water	
EYES Dust or fume: Flush with water for 15 minutes, call a physician.	
INGESTION Dust or fume: Drink water, induce vomiting by sticking finger down throat, call a physician.	
INHALATION Dust or fume: Remove victim to fresh air, call a physician.	

Chemical
ALLOY 724

CAS No.

CHEMICAL NAME ALLOY B-27**SECTION VI - TOXICOLOGY (Product)**

ACUTE ORAL	Lowest Published Lethal Dose - (Copper) 120 mg/kg (human)	CARCINOGENIC	Dust may cause respiratory tract cancer
ACUTE DERMAL LD 50	No available data	MUTAGENIC	Not known to be mutagenic
ACUTE INHALATION LC 50	No available data	EYE IRRITATION	Dust and fume - irritants
		PRIMARY SKIN IRRITATION	Dust is irritant
PRINCIPAL ROUTES OF ABSORPTION			
Inhalation, ingestion of metal, dust or fume			
EFFECTS OF ACUTE EXPOSURE			
Dust or fume: Congestion, gastro-intestinal distress, chills, dermatitis			
EFFECTS OF CHRONIC EXPOSURE			
Dust and fume: May cause kidney, liver or spleen damage, anemia			

SECTION VII - SPILL OR LEAKAGE PROCEDURES (Control Procedures)**STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED**

Dust or fume - Wear NIOSH/MSHA approved dust and fume respirator. Follow OSHA regulations for respirator use. (See 29 CFR 1910.134). Shovel or sweep up and place in an approved DOT container and seal. Wash all contaminated clothing before reuse.

In the event of a large spill use the emergency telephone number shown on the front of this sheet.

WASTE DISPOSAL METHOD

Dispose of contaminated product and materials used in cleaning up spills or leaks in a manner approved for this material. Consult appropriate federal, state and local regulatory agencies to ascertain proper disposal procedures.

SECTION VIII - REACTIVITY DATA

STABLE	X UNSTABLE	AT	°C	°F	HAZARDOUS POLYMERIZATION	MAY OCCUR
						WILL NOT OCCUR X
CONDITIONS TO AVOID		Presence of carbon monoxide (during melting)				
INCOMPATIBILITY (Materials To Avoid)		Dust and fume - acetylene, chloride				
HAZARDOUS DECOMPOSITION PRODUCTS		Copper fume, nickel carbonyl				

SECTION IX - PHYSICAL DATA

MELTING POINT	2057°F	VAPOR PRESSURE	VOLATILES
BOILING POINT		SOLUBILITY IN WATER	EVAPORATION RATE
SPECIFIC GRAVITY (H ₂ O = 1)		SM	VAPOR DENSITY (Air = 1)
DENSITY	.310 lbs/m ³		

INFORMATION FURNISHED BY:

ALG
A. L. Gaudreau
(203) 789-5434

DATE

October 19, 1984

Department of Environmental Hygiene and Toxicology

Olin

CORPORATION

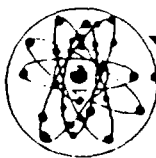
120 Long Ridge Road, Stamford, Connecticut 06904

OCEANSM Network

EMERGENCY PHONE (203) 356-2345

TRW-00756

0908-2122

**HUSSEY COPPER LTD.**BY: HUSSEY COPPER CORP., GENERAL PARTNER
LEETSDALE, PA 15056

M.S.D.S. HC-85-100LC

MATERIAL SAFETY DATA SHEET

DATE: 3/26/85

REV. DATE: 4/21/86

REVISION NO.: 1

SECTION I

MANUFACTURER'S NAME: HUSSEY COPPER LTD.
ADDRESS: Washington Street LEETSDALE, PA. 15056
EMERGENCY PHONE NO.: 412-857-4200
CHEMICAL NAME AND SYNONYMS: COPPER; LEAD
TRADE NAME AND SYNONYMS: Lead coat, copper, lead, Pb coated copper
Lead coated copper sheets
CHEMICAL FAMILY: COPPER AND LEAD

SECTION II - HAZARDOUS INGREDIENTS

INGREDIENT	PERCENT	CAS NO.	OSHA-PEL/ACGIH-TLV
Copper base metal	99.9	7440-50-8	Exposure Levels See Section V
Lead Coating	15 lbs. max per 100 ft. ² of copper surface	7439-92-1	

HAZARDOUS MIXTURES OF OTHERS LIQUIDS, SOLIDS, OR GASES:

If exposure to copper dust/fume and lead dust/fume are kept below Permissible Exposure Limits (PEL)/Threshold Limit Value (TLV) all trace elements should not pose any health risk.

SECTION III - PHYSICAL DATA

MELTING copper 1949 ° F, lead 621° F
Vapor Pressure (mm Hg.) Not Applicable
Solubility in Water negligible
Specific Gravity (H₂O = 1) copper 8.9 lead 11.0

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used) Not applicable*

Extinguishing Media Not Applicable

Special Fire Fighting Procedures Not applicable

Unusual Fire and Explosion Hazards Not applicable

TRW-00757

* Under normal conditions. Heavy concentrations of fine copper dust may cause flash fire if exposed to ignition source.



OCEAN[®] Network
EMERGENCY PHONE 1-800-OLIN-911

MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS Copper Nickel Alloy		
CHEMICAL FAMILY Copper	FORMULA Mixture	TRADE NAME Alloy 725
DESCRIPTION Metal		CAS NO. Not assigned/mixture

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Precautions needed for abrasive, melting or other operations generating a dust or fume. Do not get dust or fume in eyes, on skin or on clothing. Do not take internally. Wash thoroughly with soap and water before eating or smoking. Avoid breathing dust or fumes.	
PROTECTIVE EQUIPMENT Eyes Goggles Gloves Impervious Other NIOSH/MSHA approved high efficiency particulate respirator if excessive dusting/fumes occur	VENTILATION REQUIREMENTS As required to keep airborne concentrations below the TLV for copper, nickel and tin.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper	Dust 1 mg/m ³ Fume 0.1 mg/m ³	TD ₀₁ =120 ug/kg (human) LD ₀₁ =5 mg/kg guinea pig	No data	Dust and fume - chills, gastro-intestinal distress
Nickel	Dust 1 mg/m ³	No data	No data	Dust or metal-dermatitis, suspect carcinogen
Tin	Dust 2 mg/m ³	No data	No data	Mucous membrane irritation accumulation in lung (pneumoconiosis)

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD Not Applicable	OSHA CLASSIFICATION Non-combustible solid	FLAMMABLE EXPLOSIVE LIMITS	LOWER N/A	UPPER N/A
EXTINGUISHING MEDIA Use extinguishing media suitable for surrounding materials.				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved positive pressure self-contained breathing apparatus where any material is involved in a fire.				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE None established for mixture. (Copper fume 0.2 mg/kg, Nickel 1 mg/m ³ , Tin 2 mg/m ³ ACGIH 1985-86)	
SYMPTOMS OF OVER EXPOSURE Dust or Fume: Sneezing, congestion, metallic taste, nausea, chills, dermatitis	
EMERGENCY FIRST-AID PROCEDURES	
SKIN Dust or fume: Wash with soap and water before reating of smoking. If an irritation develops, call a physician.	
EYES Dust or fume: Flush with water for 15 minutes, call a physician.	
INGESTION Dust: Not a likely route or exposure. If ingested, call a physician.	
INHALATION Dust or Fume: Remove victim to fresh air, call a physician.	

TRW-00758

0908-2124

Chemical

CAS No.

SECTION VI - TOXICOLOGY (Product)

ACUTE ORAL LD 50	No data for alloy	CARCINOGENICITY	See *** below
ACUTE DERMAL LD 50	No data for alloy	MUTAGENICITY	No data
ACUTE INHALATION LC 50	No data for alloy	EYE IRRITATION	Dust and fume - irritant
		PRIMARY SKIN IRRITATION	Dust may be an irritant
*** Nickel is considered a carcinogen by NTP			
PRINCIPAL ROUTES OF ABSORPTION			
Inhalation, dermal exposure to metal dust or fume			
EFFECTS OF ACUTE EXPOSURE Dust or fume: Metal fume fever, respiratory irritation, skin, eye and mucous membrane irritation.			
EFFECTS OF CHRONIC EXPOSURE Dermatitis. Chronic over-exposure may cause kidney and liver effects. Nickel has been associated with lung cancers.			

SECTION VII - SPILL AND LEAKAGE PROCEDURES (Control Procedures)

ACTION FOR MATERIAL RELEASE OR SPILL

Dust or fume - Wear NIOSH/MSHA approved high efficiency particulate respirator. Follow OSHA regulations for respirator use. (See 29 CFR 1910.134). Wear goggles, coveralls, impervious gloves and boots. Shovel or sweep up and place in an appropriate container. Wash all contaminated clothing before reuse.

In the event of a large spill use the emergency telephone number shown on the front of this sheet.

TRANSPORTATION EMERGENCY, CONTACT CHEMTREC 800-424-9300

WASTE DISPOSAL METHOD

Dispose of contaminated product, empty containers and materials used in cleaning up spills or leaks in a manner approved for this material. Consult appropriate federal, state and local regulatory agencies to ascertain proper disposal procedures.

SECTION VIII - SHIPPING DATA

D.O.T. CLASS

Not regulated

SECTION IX - REACTIVITY DATA

STABLE	X	UNSTABLE	AT	_____ °C	_____ °F	HAZARDOUS POLYMERIZATION	MAY OCCUR
							WILL NOT OCCUR X
CONDITIONS TO AVOID		Presence of carbon monoxide during melting					
INCOMPATIBILITY (Material to Avoid)		Dust and fume - acetylene, chloride					
HAZARDOUS DECOMPOSITION PRODUCTS		Copper fume, nickel carbonyl, tin oxide					

SECTION X - PHYSICAL DATA

MELTING POINT	1940°F	VAPOR PRESSURE	N/A	VOLATILES	N/A
BOILING POINT	No data	SOLUBILITY IN WATER	Insoluble	EVAPORATION RATE	N/A
SPECIFIC GRAVITY (H ₂ O = 1)	*	pH	N/A	VAPOR DENSITY (Air = 1)	N/A
*DENSITY	.323 lbs/in ³				

INFORMATION FURNISHED BY:

Environmental Hygiene DATE
and Toxicology Department
(203) 789-5436

March 18, 1986

TRW-00759

Department of Environmental Hygiene and Toxicology
(203) 789-5436

1058

olin CORPORATION

120 Long Ridge Road, Stamford, Connecticut 06904

OCEAN® Network

EMERGENCY PHONE 1-800-OLIN-911

0908-2125



OCEAN® Network

EMERGENCY PHONE 1-800-OLIN-911

**MATERIAL
SAFETY DATA****SECTION I - IDENTIFICATION**

CHEMICAL NAME & SYNONYMS Nickel Silver 72-18		
CHEMICAL FAMILY Copper	FORMULA Mixture	TRADE NAME Alloy 735
DESCRIPTION Metal		CAS NO. Not assigned/mixture

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Precautions needed for abrasive, melting or other operations generating a dust or fume. Do not get dust or fume in eyes, on skin or clothing. Do not take internally. Wash thoroughly with soap and water before eating or smoking. Avoid breathing dust or fumes.	
PROTECTIVE EQUIPMENT Eyes Goggles Gloves Impervious Other NIOSH/MSHA approved high efficiency particulate respirator if excessive dusting/fumes occurs.	VENTILATION REQUIREMENTS As required to keep airborne concentrations below TLV for copper, zinc and nickel.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL		OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper	Dust	1 mg/m ³	TD _{LO}	No data	Metal fume fever, respiratory irritation
	Fume	0.1 mg/m ³	120 ug/kg (human)		
Zinc	Fume	5 mg/m ³	No data	TC _{LO} 124 mg/m ³ /50 min.(hum.)	Metal fume fever
Nickel	Dust	1 mg/m ³ (g.pig)	LD _{LO} =5mg/kg No data		Dermatitis, suspect carcinogen

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD Not Applicable	OSHA CLASSIFICATION Non-combustible solid	FLAMMABLE EXPLOSIVE LIMITS	LOWER N/A	UPPER N/A
EXTINGUISHING MEDIA Use extinguishing media suitable for surrounding materials.				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved positive pressure self-contained breathing apparatus when any material is involved in a fire.				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE None established for mixture (copper fume 0.2 mg/m ³ , zinc fume 5 mg/m ³ , Nickel 1 mg/m ³ (ACGIH 1985-86).	
SYMPTOMS OF OVER EXPOSURE Dust and fume - sneezing, congestion, metallic taste, nausea, chills, fever, dermatitis.	
SKIN	Dust or fume: Wash with soap and water before eating or smoking. If an irritation develops, call a physician.
EYES	Dust or fume: Flush thoroughly with water for 15 minutes. Call a physician.
INGESTION	Dust: Not a likely route of exposure. If ingested, call a physician.
INHALATION	Dust or Fume: Remove victim to fresh air. Call a physician.

Chemical

CAS No.

0908-2126

TRW-00760

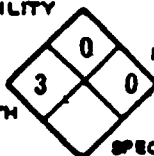
OCEANSM Network

EMERGENCY PHONE (203) 356-2345

Olin Corporation, 120 Long Ridge Road

Stamford, Connecticut 06904

FLAMMABILITY



REACTIVITY

HEALTH

HAZARD RATING

SPECIAL

MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS Nickel Silver 10%		
CHEMICAL FAMILY Copper	FORMULA	TRADE NAME Alloy 740
DESCRIPTION Metal	CAS NO.	

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Avoid breathing dust or fumes. Do not take internally.	
CORROSIVE ACTION ON MATERIALS (Metals, Plastic, Rubber, Etc.)	
PROTECTIVE EQUIPMENT	VENTILATION REQUIREMENTS
Eyes Dust - goggles Gloves Other	Local exhaust or general ventilation required as dictated by airborne concentrations.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROX. %	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper		Dust 1 mg/m ³ Fume 0.1 mg/m ³	31 mg/m ³		Gastro-intestinal
Nickel		Dust 1 mg/m ³			Dermatitis, lung cancer
Zinc		Fume 5 mg/m ³	LDLO 500 mg/kg (human)	TCLO 600 mg/m ³ (human)	Metal fume fever

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD Not Applicable	OSHA CLASSIFICATION	FLAMMABLE EXPLOSIVE LIMITS	LOWER	UPPER
EXTINGUISHING MEDIA Not Applicable				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Not Applicable				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE None established.	
SYMPTOMS OF OVER EXPOSURE DUST and fume - chills, sneezing, congestion, metallic taste, fever, nausea, dermatitis	
EMERGENCY FIRST-AID PROCEDURES	
SKIN Flush thoroughly with water.	
EYES Flush with water for 15 minutes, call a physician.	
INGESTION Drink water, induce vomiting by sticking finger down throat, call a physician.	
INHALATION Remove victim to fresh air, call a physician.	

Chemical Alloy 740

CAS No.

TRW-00761

0908-2127



OCEAN® Network

EMERGENCY PHONE 1-800-OLIN-911

**MATERIAL
SAFETY DATA****SECTION I - IDENTIFICATION**

CHEMICAL NAME & SYNONYMS Nickel Silver 18%		
CHEMICAL FAMILY Copper	FORMULA Mixture	TRADE NAME Alloy 752
DESCRIPTION Metal		CAS NO. Not assigned/mixture

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Precautions needed for abrasive, melting or other operations generating a dust or fume. Do not get dust or fume in-eyes, on skin or on clothing. Do not take internally. Wash thoroughly with soap and water before eating or smoking. Avoid breathing dust or fumes.	
PROTECTIVE EQUIPMENT	VENTILATION REQUIREMENTS
Eyes Goggles Gloves Impervious Other NIOSH/MSHA approved high efficiency particulate respirator if excessive dusting/fumes occur	As required to keep airborne concentrations below the TLV for copper, nickel and zinc.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL		OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper	Dust Fume	1 mg/m ³ 0.1 mg/m ³	TD ₀₁ =120 µg/kg (human)	No data	Dust and fume - chills, gastro-intestinal distress
Nickel	Dust	1 mg/m ³	LD ₅₀ =5 mg/kg (guinea pig)	No data	Dust or metal-dermatitis, suspect carcinogen
Zinc	Fume	5 mg/m ³	No data	TC _{LD} =124 mg/m ³ /50 min. (human)	Metal fume fever

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD Not Applicable	OSHA CLASSIFICATION Non-combustible solid	FLAMMABLE EXPLOSIVE LIMITS	LOWER N/A	UPPER N/A
EXTINGUISHING MEDIA Use extinguishing media suitable for surrounding materials.				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved positive pressure self-contained breathing apparatus where any material is involved in a fire.				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE None established for mixture (Copper fume - 0.2 mg/m ³ , Nickel - 1 mg/m ³ , Zinc fume - 5 mg/m ³ ACGIH 1985-86).	
SYMPTOMS OF OVER EXPOSURE Dust or Fume: Sneezing, congestion, metallic taste, nausea, chills, dermatitis	
SKIN	EMERGENCY FIRST-AID PROCEDURES Dust or fume: Wash with soap and water before eating or smoking. If an irritation develops, call a physician.
EYES	Dust or fume: Flush with water for 15 minutes, call a physician.
INGESTION	Dust: Not a likely route of exposure. If ingested, call a physician.
INHALATION	Dust or Fume: Remove victim to fresh air, call a physician.

Chemical

Alloy 752

CAS No.

0908-2128

TRW-00762



OCEAN® Network
EMERGENCY PHONE 1-800-OLIN-911

MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS Nickel Silver, 59-12		
CHEMICAL FAMILY Copper	FORMULA Mixture	TRADE NAME Alloy 762
DESCRIPTION Metal	CAS NO. Not assigned/mixture	

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Precautions needed for abrasive, melting or other operations generating a dust or fume. Do not get dust or fume in eyes, on skin or clothing. Do not take internally. Wash thoroughly with soap and water before eating or smoking. Avoid breathing dust or fumes.	
PROTECTIVE EQUIPMENT Eyes Goggles Gloves Impervious Other NIOSH/MSHA approved high efficiency particulate respirator if excessive dusting/fumes occurs.	VENTILATION REQUIREMENTS As required to keep airborne concentrations below TLV for copper, nickel and zinc.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL		OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper	Dust	1 mg/m ³	TDLO	No data	Metal fume fever, respiratory irritation
	Fume	0.1 mg/m ³	120 ug/kg (human)		
Zinc	Fume	5 mg/m ³	No data	TCLO 124 mg/m ³ /50 min.(hum.)	Metal fume fever
Nickel	Dust	1 mg/m ³	LD ₅₀ = 5mg/kg (g.Dig)	No data	Dermatitis, suspect carcinogen

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD Not Applicable	OSHA CLASSIFICATION Non-combustible solid	FLAMMABLE EXPLOSIVE LIMITS	LOWER N/A	UPPER N/A
EXTINGUISHING MEDIA Use extinguishing media suitable for surrounding materials.				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved positive pressure self-contained breathing apparatus when any material is involved in a fire.				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE None established for mixture (copper fume 0.2 mg/m ³ , zinc fume 5 mg/m ³ , nickel 1 mg/m ³ ACGIH 1985-86).	
SYMPTOMS OF OVER EXPOSURE Dust and fume - sneezing, congestion, metallic taste, nausea, chills, fever, dermatitis.	
EMERGENCY FIRST-AID PROCEDURES SKIN Dust or fume: Wash with soap and water before eating or smoking. If an irritation develops, call a physician	
EYES Dust or fume: Flush thoroughly with water for 15 minutes. Call a physician	
INGESTION Dust: Not a likely route of exposure. If ingested, call a physician.	
INHALATION Dust or Fume: Remove victim to fresh air. Call a physician.	

Chemical

CAS No.

0908-2129

TRW-00763



OCEAN® Network
EMERGENCY PHONE 1-800-OLIN-911

MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS Nickel Silver 18%		
CHEMICAL FAMILY Copper	FORMULA Mixture	TRADE NAME Alloy 770
DESCRIPTION Metal		CAS NO. Not assigned/mixture

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Precautions needed for abrasive, melting or other operations generating a dust or fume. Do not get dust or fume in eyes, on skin or on clothing. Do not take internally. Wash thoroughly with soap and water before eating or smoking. Avoid breathing dust or fumes.	
PROTECTIVE EQUIPMENT Eyes Goggles Gloves Impervious Other NIOSH/MSHA approved high efficiency particulate respirator if excessive dusting/fumes occur	VENTILATION REQUIREMENTS As required to keep airborne concentrations below the TLV for copper, nickel and zinc.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper	Dust 1 mg/m ³ Fume 0.1 mg/m ³	TD _{LO} =120 ug/kg (human) LD _{LO} =5 mg/kg guinea pig	No data	Dust and fume - chills, gastro-intestinal distress
Nickel	Dust 1 mg/m ³		No data	Dust or metal-dermatitis, suspect carcinogen
Zinc	Fume 5 mg/m ³	No data	No data	Metal fume fever

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD Not Applicable	OSHA CLASSIFICATION Non-combustible solid	FLAMMABLE EXPLOSIVE LIMITS	LOWER N/A	UPPER N/A
EXTINGUISHING MEDIA Use extinguishing media suitable for surrounding materials.				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved positive pressure self-contained breathing apparatus where any material is involved in a fire.				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE None established for mixture. Copper fume 0.2 mg/m ³ , nickel 1 mg/m ³ , zinc 5 mg/m ³ ACGIH 1985-86)	
SYMPTOMS OF OVER EXPOSURE Dust or Fume: Sneezing, congestion, metallic taste, nausea, chills, dermatitis	
EMERGENCY FIRST-AID PROCEDURES SKIN Dust or fume: Wash with soap and water before eating or smoking. If an irritation develops, call a physician. Dust or fume: Flush with water for 15 minutes, call a physician.	
EYES	
INGESTION Dust: Not a likely route of exposure. If ingested, call a physician.	
INHALATION Dust or Fume: Remove victim to fresh air, call a physician.	

Chemical

CAS No.

0908-2130

11

TRW-00764

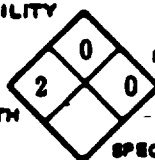


EMERGENCY PHONE (203) 356-2345

Olin Corporation, 120 Long Ridge Road

Stamford, Conn. 06904

FLAMMABILITY



REACTIVITY

HEALTH

HAZARD RATING

SPECIAL

MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS Copper, Electrolytic Tough Pitch (ETP)		
CHEMICAL FAMILY Copper	FORMULA	TRADE NAME Alloy 1092
DESCRIPTION Metal		CAS NO.

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Avoid breathing dust or fumes. Do not take internally.	
CORROSIVE ACTION ON MATERIALS (Metals, Plastic, Rubber, Etc.)	
PROTECTIVE EQUIPMENT	VENTILATION REQUIREMENTS
Eyes (Dust) Goggles Gloves Other	As required to keep airborne concentrations below TLV.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROX. %	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper		Dust 1.0 mg/m ³ Fume 0.1 mg/m ³			Gastro-intestinal

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT NOT METHOD Applicable	OSHA CLASSIFICATION	FLAMMABLE EXPLOSIVE LIMITS	LOWER	UPPER
EXTINGUISHING MEDIA Not Applicable				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Not Applicable				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE Copper, dust 1 mg/m ³ , Fume 0.2 mg/m ³ (ACGIH 1983)	
SYMPTOMS OF OVER EXPOSURE Dust and fume, sneezing, congestion, metallic taste, gastro-intestinal distress, chills, fever	
EMERGENCY FIRST-AID PROCEDURES	
SKIN	Flush thoroughly with water.
EYES	Flush with water for 15 minutes, call a physician.
INGESTION	Drink water, induce vomiting by sticking finger down throat, call a physician.
INHALATION	Remove victim to fresh air, call a physician.

Chemical Alloy 1092

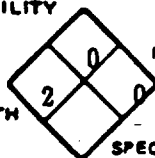
CAS No.

TRW-00765

0908-2131



FLAMMABILITY



REACTIVITY

HEALTH

HAZARD RATING

SPECIAL

MATERIAL SAFETY DATA

EMERGENCY PHONE (203) 356-2345

Olin Corporation, 120 Long Ridge Road

Stamford, Conn. 06904

SECTION I - IDENTIFICATION

Silver Bearing Low Oxygen Copper		
CHEMICAL FAMILY Copper	FORMULA	TRADE NAME Alloy 1093
DESCRIPTION Metal	CAS NO.	

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Avoid breathing dust or fumes. Do not take internally.	
CORROSIVE ACTION ON MATERIALS (Metals, Plastic, Rubber, Etc.)	
PROTECTIVE EQUIPMENT	VENTILATION REQUIREMENTS
Eyes (Dust) goggles Gloves Other	As required to keep airborne concentrations below TLV for copper dust.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROX. %	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper		Dust 1 mg/m ³ Fume 0.1 mg/m ³			Gastro-intestinal

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD Not Applicable	OSHA CLASSIFICATION	FLAMMABLE EXPLOSIVE LIMITS	LOWER	UPPER
EXTINGUISHING MEDIA Not Applicable				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Not Applicable				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE Copper, Dust 1 mg/m ³ , Fume 0.2 mg/m ³ (ACGIH 1983)	
SYMPTOMS OF OVER EXPOSURE Dust and fume - sneezing, congestion, metallic taste, nausea, chills, fever	
SKIN Flush thoroughly with water.	EMERGENCY FIRST-AID PROCEDURES
EYES Flush with water for 15 minutes, call a physician.	
INGESTION Drink water, induce vomiting, call a physician.	
INHALATION Remove victim to fresh air, call a physician.	

Chemical Alloy 1093

CAS No.

TRW-00766

0908-2132



EMERGENCY PHONE (203) 356-2345

Olin Corporation, 120 Long Ridge Road

Stamford, Conn. 06904



MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

Silver Bearing Low Oxygen Copper		
CHEMICAL FAMILY Copper	FORMULA	TRADE NAME Alloy 1094
DESCRIPTION Metal		CAS NO.

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Avoid breathing dust or fumes. Do not take internally.	
CORROSIVE ACTION ON MATERIALS (Metals, Plastic, Rubber, Etc.)	
PROTECTIVE EQUIPMENT	VENTILATION REQUIREMENTS
Eyes (Dust) goggles Gloves Other	As required to keep airborne concentrations below TLV for copper dust.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROX. %	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper		Dust 1 mg/m ³ Fume 0.1 mg/m ³			Gastro-intestinal

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD Not Applicable	OSHA CLASSIFICATION	FLAMMABLE EXPLOSIVE LIMITS	LOWER	UPPER
EXTINGUISHING MEDIA Not Applicable				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Not Applicable				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE Copper, Dust 1 mg/m ³ , Fume 0.2 mg/m ³ (ACGIH 1983)	
SYMPTOMS OF OVER EXPOSURE Dust and fume - sneezing, congestion, metallic taste, nausea, chills, fever	
EMERGENCY FIRST-AID PROCEDURES	
SKIN	Flush thoroughly with water.
EYES	Flush with water for 15 minutes, call a physician.
INGESTION	Drink water, induce vomiting, call a physician.
INHALATION	Remove victim to fresh air, call a physician.

Chemical

Alloy 1094

CAS No.

TRW-00767

0908-2133



OCEAN® Network
EMERGENCY PHONE 1-800-OLIN-911

MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS Copper Alloy		
CHEMICAL FAMILY Copper	FORMULA Mixture	TRADE NAME ALLOY 1975
DESCRIPTION Red orange metallic solid		CAS NO. Not assigned/mixture

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Precautions needed for abrasive, melting or other operations generating a dust or fume. Do not get dust or fume in eyes, on skin or on clothing. Do not take internally. Wash hands with soap and water before eating or smoking. Avoid breathing dust or fumes.	
PROTECTIVE EQUIPMENT	VENTILATION REQUIREMENTS
Eyes Dust - goggles Gloves Impervious (if necessary) Other NIOSH/MSHA approved high efficiency particulate respirator if excessive dusting/fumes occurs	As required to keep airborne concentrations of copper dust below TLV.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper	Dust 1 mg/m ³ Fume 0.1 mg/m ³	TD _{LO} 120 ug/kg (human)	No data	Inhalation - metal fume fever, respiratory tract irritation

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD Not Applicable	OSHA CLASSIFICATION Non-combustible solid	FLAMMABLE EXPLOSIVE LIMITS	LOWER N/A	UPPER N/A
EXTINGUISHING MEDIA Use extinguishing media suitable for surrounding material.				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved positive pressure self-contained breathing apparatus when any material is involved in a fire.				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE Copper dust 1 mg/m ³ , fume 0.2 mg/m ³ (ACGIH 1985-86)	
SYMPTOMS OF OVER EXPOSURE Dust and fume - sneezing, congestion, metallic taste, nausea, chills, fever	
Dust or fume: Wash with EMERGENCY FIRST-AID PROCEDURES SKIN soap and water before eating or smoking. If an irritation develops, call a physician.	
EYES	Dust or fume: Flush with water for 15 minutes, call a physician.
INGESTION	Dust: Not a likely route of exposure. If ingested, call a physician.
INHALATION	Dust or fume: Remove victim to fresh air, call a physician.

TRW-00768

CHEMICAL NAME Alloy 1975

SECTION VI - TOXICOLOGY (Product)

ACUTE ORAL LD 50		CARCINOGENICITY	Not known to be carcinogenic
ACUTE ORAL TD_{LO}	Copper 120 ug/kg (human)	MUTAGENICITY	Not known to be mutagenic
ACUTE DERMAL LD 50	No data	EYE IRRITATION	Dust is irritating
ACUTE INHALATION LC 50	No data	PRIMARY SKIN IRRITATION	Dust may be irritating
PRINCIPAL ROUTES OF ABSORPTION			
Inhalation of dust or fume			
EFFECTS OF ACUTE EXPOSURE Dust or fume: Skin, eye and mucous membrane irritation, metal fume fever, respiratory tract irritation.			
EFFECTS OF CHRONIC EXPOSURE None expected at industrial use levels. Chronic overexposure may cause liver and kidney effects.			

SECTION VII - SPILL AND LEAKAGE PROCEDURES (Control Procedures)

ACTION FOR MATERIAL RELEASE OR SPILL

Dust or Fume: Wear NIOSH/MSHA approved high efficiency particulate respirator. Follow OSHA regulations for respirator use (See 29 CFR 1910.134). Wear goggles, coveralls, impervious gloves and boots. Shovel or sweep up and place in an appropriate container. Wash all contaminated clothing before reuse.

In the event of a large spill, use the emergency telephone number shown on the front of this sheet.

TRANSPORTATION EMERGENCY, CONTACT CHEMTREC 800-424-9300

WASTE DISPOSAL METHOD

Dispose of contaminated product and materials used in cleaning up spills or leaks in a manner approved for this material. Consult appropriate federal, state and local regulatory agencies to ascertain proper disposal procedures.

SECTION VIII - SHIPPING DATA

D.O.T. CLASS

Not regulated

SECTION IX - REACTIVITY DATA

STABLE	X UNSTABLE	AT _____ °C _____ °F	HAZARDOUS POLYMERIZATION	MAY OCCUR
				WILL NOT OCCUR X
CONDITIONS TO AVOID Presence of carbon monoxide during melting				
INCOMPATIBILITY (Material to Avoid) dust and fume - acetylene, chlorine				
HAZARDOUS DECOMPOSITION PRODUCTS copper fume				

SECTION X - PHYSICAL DATA

MELTING POINT	No data	VAPOR PRESSURE	N.A.	VOLATILES	N.A.
BOILING POINT	No data	SOLUBILITY IN WATER	Insoluble	EVAPORATION RATE	N.A.
SPECIFIC GRAVITY (H ₂ O = 1)	No data	pH	N.A.	VAPOR DENSITY (Air = 1)	N.A.

INFORMATION FURNISHED BY:

Environmental Hygiene
and Toxicology
(203) 789-5436

DATE

March 21, 1986

TRW-00769

Departn.

0908-2135

and Toxicology
(203) 789-5436

1133

Olin CORPORATION

120 Long Ridge Road, Stamford, Connecticut 06904

OCEAN® Network

EMERGENCY PHONE 1-800-OLIN-911

MATERIAL SAFETY DATA SHEET

EASTERN METAL MILL PRODUCTS CO.

1105 East Street

Dedham, MA 02026

Telephone: (617) 329-1200

Date: November 25, 1985

Revised: November 1, 1989

SECTION I. MATERIAL IDENTIFICATION

Copper/Copper Alloys

See attached alloy composition sheets for alloy presence and percentages of alloying ingredients.

SECTION II. HAZARDOUS INGREDIENTS

Copper/Copper Alloys

	CAS Number		OSHA-PEL 8-hr TWA	ACGIH-TLV 3-HR TWA (1988-89)	ACGIH STEL (1988-89)
Aluminum #	(7429-90-5)	(Dust)	15 mg/m ³	10 mg/m ³	--
		(Fume)	5 mg/m ³	5 mg/m ³	--
Antimony #	(7440-36-0)		0.5 mg/m ³	0.5 mg/m ³	--
Arsenic #	(7440-38-2)		0.5 mg/m ³	0.02 mg/m ³	--
Beryllium #	(7440-41-7)		0.002 mg/m ³	0.002 mg/m ³	0.005*
Cadmium #	(7440-43-9)	(Dust)	0.2 mg/m ³	0.05 mg/m ³	--
		(Fume)	0.1 mg/m ³	0.05 mg/m ³ *	--
Carbonblack	(1333-86-4)		3.5 mg/m ³	--	--
Chromium #	(7440-47-3)		1 mg/m ³	0.5 mg/m ³	--
Cobalt #	(7440-48-4)		0.05 mg/m ³	0.1 mg/m ³	--
Copper #	(7440-50-8)	(Dust)	1 mg/m ³	1 mg/m ³	--
		(Fume)	0.1 mg/m ³	0.2 mg/m ³	--
Iron	(1309-37-1)		10 mg/m ³	5 mg/m ³	--
				(As iron oxide fume)	--
Lead # ⊙	(7439-92-1)		0.05 mg/m ³	0.15 mg/m ³	--
Manganese #	(7439-96-5)	(Dust)	5 mg/m ³	5 mg/m ³	--
		(Fume)	--	1 mg/m ³	3 mg/m ³
Nickel #	(7440-02-0)		1 mg/m ³	1 mg/m ³	--
Phosphorus #	(7723-14-0)		0.1 mg/m ³	0.1 mg/m ³	--
Silicon	(7440-21-3)	(Dust)	10 mg/m ³	10 mg/m ³ ⊙	--
		(Fume)	5 mg/m ³	--	--
Silver #	(7440-22-4)		0.01 mg/m ³	0.1 mg/m ³	--
Sulphur Dioxide #	(7446-09-5)		5 mg/m ³	5 mg/m ³	5/10 mg/m ³
Tellurium #	(13494-80-9)		0.1 mg/m ³	0.1 mg/m ³	--
Tin ⊙	(7440-31-5)		2 mg/m ³	2 mg/m ³	0.2 mg/m ³ (contemplated)
Zinc #	(1314-13-2)	(Dust) ⊙	10 mg/m ³	10 mg/m ³	--
		(Fume)	5 mg/m ³	5 mg/m ³	10 mg/m ³
Zirconium	(7440-67-7)		5 mg/m ³	5 mg/m ³	10 mg/m ³

*Ceiling Limit

Note: antimony trioxide, beryllium, cadmium, chromium, cobalt-chromium alloy, lead and nickel have been identified as potential human carcinogens. # denotes a toxic chemical or chemicals subject to reporting requirements of Section 313 of Title III of the S.A.R.A. of 1986 and CFR Part 372.

⊙ Value is for total dust containing no asbestos and less than 1% free silicon.

⊙ Contemplated change to 0.2 STEL and 0.1 TWA

⊙ Under court remand.

SECTION III. PHYSICAL DATA

Physical Form:	Solid	Specific Gravity:	7.45 - 9.00
Boiling Point:	Not Applicable	Vapor Density:	Not Applicable
Freeze-Melt Temperature:	Approximately 1290° - 2260° F	Solubility in H ₂ O:	Insoluble
Vapor Pressure:	Not Applicable	Color:	Silver or Yellow to Red
Evaporation Rate:	Not Applicable	Odor:	None

SECTION IV. FIRE AND EXPLOSION DATA

Flash Point: (Method Used) Not Applicable

Extinguishing Media: See Below

Flammable Limits (LEL-UEL) Not Applicable

Auto Ignition Temp. - Not Applicable

Special Fire Fighting Procedures: Solid massive form is not combustible. Fire and explosion hazards are moderate when material is in the form of dust and exposed to heat, flames, chemical reaction, or in contact with powerful oxidizers. Use special mixtures of dry chemical or sand. Firefighters should wear self-contained breathing apparatus and protective clothing.

SECTION V. REACTIVITY DATA

Stability: Stable

Conditions to Avoid: Stable under normal conditions of transport and storage. Molten metal may react violently with water.

Incompatibility (Materials to Avoid): Acids, bases, and oxidizers.

Hazardous Decomposition or Byproducts: Metal fume.

Hazardous Polymerization: Will not occur.

SECTION VI. HEALTH HAZARD DATA

Permissible exposure limits and threshold limit values. See Section II.

TRW-00771

Route(s) of Entry: Inhalation: Yes; Skin: Yes; Ingestion: Yes

Under normal handling conditions the solid alloy presents no significant health hazards. Processing of the alloy by dust or fume producing operation (grinding, buffing, heating, welding, etc.) may result in the potential for exposure to airborne metal particulates or fume. The exposure levels in Section II are relevant to fumes and dusts.

Effects of Overexposure:

Aluminum — Excessive exposure to aluminum fume and dust has been associated with lung disease, but this effect is probably due to simultaneous silica exposure.

Antimony — Antimony and its compounds are irritating to the skin and mucous membranes and are systemic poisons. Effects are reported to include metallic taste in the mouth, vomiting, colic, loss of appetite and weight, cardiac problems, and diarrhea. In addition, dermatitis may result which starts as an inflammation of the hair follicles and can progress through pus formation and sloughing to leave a contracted scar.

Beryllium — Inhalation of beryllium dust or fume may result in the production of an acute or chronic systemic disease depending upon the level of exposure and the beryllium compound involved. Granulomatous lesions of the skin, liver, kidneys, spleen, and lymph nodes have been reported.

Damage to the lungs may be in both the acute and chronic forms, both of which have similar signs and symptoms. These include a relatively non-productive cough, progressive difficulty in breathing, loss of appetite, and loss of weight. The major difference between the two is the suddenness of onset and the rate of progression. In the acute form, the symptoms appear in several hours to several weeks after exposure and there is usually rapid progression of signs including dyspnea, anorexia, and extreme weight loss. Complete recovery is possible and fatal cases usually result from acute heart disease. In chronic beryllium disease, the symptoms or signs are generally delayed in their onset and are persistent in nature. They may be triggered or aggravated by stresses such as pregnancy, respiratory infection, and tuberculosis. In the progression of the disease, symptoms of heart disease may occur.

Beryllium is also a suspected human carcinogen and has caused cancer in laboratory animals

0908-2137

Cadmium — Inhalation of cadmium fumes may cause respiratory irritation with a sore, dry throat and a burning sensation followed by a cough, chest pain, and difficulty in breathing. Bronchitis, pneumonitis, and pulmonary edema have been reported as a result of the irritation of the fumes. Headaches, dizziness, loss of appetite, and weight loss have also been reported and the liver, kidneys and bone marrow may be injured by the presence of the metal.

Continued exposure to lower levels of cadmium has resulted in chronic poisoning characterized by irreversible lung

damage and kidney damage. A single, high level exposure to cadmium can cause severe lung irritation which may be fatal. Cadmium is also a suspected human carcinogen.

Chromium — In some workers, chromium compounds act as allergens and may cause dermatitis and may also produce pulmonary sensitization. Chromic acid and chromates have a direct corrosive effect on the skin and the mucous membranes of the upper respiratory tract. Although rare, there may be the possibility of skin and pulmonary sensitization. IARC has determined that there is sufficient evidence of increased lung cancer among workers in the chromate-producing industry and possible chromium alloy workers. This determination is supported by sufficient evidence for carcinogenicity to animals and possible mutagenicity testing of Cr VI compounds.

Cobalt — Cobalt has been reported as causing hypersensitization type dermatitis in individuals who are susceptible. Animal studies have shown that particulate cobalt is an acutely irritating substance and industrial exposures, possibly combined with small amounts of silica, are reported capable of producing serious pneumoconiosis which is initially of an insidious nature.

Copper — Melting, grinding, cutting of copper may produce fumes or dust exposure and breathing these fumes or dust may present potentially significant health hazards. Fumes of copper may cause metal fume fever with flu-like symptoms and skin and hair discoloration. While industrial dermatitis has not been reported, keratinization of the hands and the soles of the feet has been reported. Systemically as well, copper dust and fume cause irritation of the upper respiratory tract, metallic taste in the mouth, and nausea.

Iron — The inhalation of iron oxide fumes or dust may cause an apparent benign pneumoconiosis which is called siderosis. This disease is reported to be disabling, but makes x-ray diagnosis of other lung conditions difficult or impossible.

Lead — Short term exposure: Lead is an accumulative poison. Inhalation effects of exposure to fumes or dust of inorganic lead may not develop quickly. Symptoms may include decreased physical fitness, fatigue, sleep disturbance, headache, aching bones and muscles, constipation, abdominal pains, and decreasing appetite. The effects are reversible and complete recovery is possible. Inhalation of large amounts of lead may lead to seizures, coma, and death.

Lead — Long term exposure: Long term exposure can result in a buildup of lead in the body and more severe symptoms. These include anemia, pale skin, a blue line at the gum margin, decreased handgrip strength, abdominal pain, severe constipation, nausea, vomiting, and paralysis of the wrist joint. Prolonged exposure may also result in kidney damage. If the nervous system is affected, usually due to very high exposures, the resulting effects include severe headache, convulsions, coma, delirium, and death. Alcohol ingestion and physical exertion may bring on symptoms. Continued exposure can result in decreased fertility and/or increased chances of miscarriage or birth defects.

Manganese — Chronic manganese poisoning may result from inhalation of dust or fume. The central nervous system is the chief site of the injury, and there also may be adverse blood and kidney effects. Chronic manganese poisoning is not a fatal disease although it is extremely disabling. Some individuals may be hypersusceptible to manganese. Freshly fanned manganese fume has caused fever and chills similar to metal fume fever.

Nickel — The most common ailment arising from contact with nickel or its compounds is an allergic dermatitis known as "nickel itch" which usually occurs when the skin is moist. Generally nickel and most salts of nickel do not cause systemic poisoning, but nickel has been identified as a suspected carcinogen. There can also be adverse effects to the lungs and nasal cavities.

Silicon — Accumulation in lungs may be responsible for benign pneumoconiosis, but is not considered to be responsible for pulmonary functional impairment or respiratory symptoms.

Tin — The inhalation of inorganic tin fumes or dust may cause an apparent benign pneumoconiosis called stannosis which is reported not to be disabling.

Zinc (as Oxide) — Zinc is very low in toxicity but inhalation of fumes may cause "metal fume fever." Onset of symptoms may be delayed 4-12 hours and include irritation of the nose, mouth and throat, cough, stomach pain, headache, nausea, vomiting, metallic taste, chills, fever, pains in the muscles and joints, thirst, bronchitis or pneumonia and a bluish tint to the skin. These symptoms go away in 24-48 hours and leave no effect.

Note: Antimony trioxide, beryllium, cadmium, chromium, cobalt-chromium alloy, lead and nickel have been identified as potential human carcinogens.

Emergency First Aid Procedures:

Eye Contact Flush well with running water to remove particulate. Get medical Attention.

Skin Contact Vacuum off excess dust. Wash well with soap and water.

Inhalation Remove to fresh air. Get medical attention.

Ingestion Seek medical attention if large quantities of material have been ingested.

0908-2138

TRW-00772

SECTION VII. PRECAUTIONS FOR SAFE HANDLING OR USE

Steps to be Taken in Case Material is Released or Spilled: No special precautions are necessary for spills of bulk material. If large quantities of dust are spilled, remove by vacuuming or wet sweeping to prevent heavy concentration of airborne dust. If liquids (acids or bases) containing solubilized metal are spilled evacuate unprotected personnel from area. Absorb liquid by means of vermiculite, dry sand or similar material. Follow federal, state, and local regulations concerning the disposal of waste.

Waste Disposal Method: Dispose of in accordance with federal, state, and local regulations. Cleanup personnel should wear respirators and protective clothing. Ventilate area of release.

Precautions to be Taken in Handling and Storing: Store material away from incompatible materials and keep dust from sources of ignition.

Other Precautions: See all other sections of this MSDS.

SECTION VIII. CONTROL MEASURES

Respiratory Protection: If exposure above the PEL or TLV, NIOSH approved respirator for fume or dust, dependent upon the source of airborne contaminant.

Ventilation: Required if dust or fume created in handling or working on this material.

Local Exhaust: Required if dust or fume created in handling or working on this material.

Mechanical (general): As above to reduce airborne dust or fume levels.

Protective Gloves: Required for melt, grind, cut or weld operations. Select glove approved for the specific operation.

Eye Protection: Required for melt, grind, cut, or weld operations. Minimum requirement of safety glasses with side shields for these operations. Melting and welding may require special eye protection including face shields and specially tinted glass. Grinding operations may also require face shields.

Other Protective Clothing or Equipment: As required for the work done on or with the metal.

Work/Hygiene Practices: As required for the work done with lead bearing materials. Meet requirements of the OSHA lead standard where necessary. Always evaluate the jobs done on this product in accordance with OSHA or relevant state, federal, or local standards.

IMPORTANT

LIABILITY DISCLAIMER

The information contained in this Material Safety Data Sheet (MSDS) is believed to be correct as it was obtained from sources we believe are reliable, including: "Threshold Limit Values & Biological Exposure Indices for 1988-89" (American Conference of Government & Industrial Hygienists), Air Contaminants—Permissible Exposure Limits (Title 29, Code of Federal Regulations, part 1910.1000—OSHA), and OSHA (Cleveland Area Office) letter of 5/15/89. However, no representations, guarantees or warranties of any kind are made as to its accuracy, suitability for particular applications, hazards connected with the use of the material, or the results to be obtained from the use thereof. User assumes all risks and liability of any use, processing or handling of any material, variations in methods, conditions and equipment used to store, handle or process the material and hazards connected with the use of the material are solely the responsibility of the user and remain at his sole discretion.

Compliance with all applicable federal, state, and local laws and regulations remains the responsibility of the user, and the user has the responsibility to provide a safe work place, to examine all aspects of its operation and to determine if or where precautions, in addition to those described herein, are required.

COPPER/COPPER ALLOYS; SCRAP

Alloy Compositions
(For MSDS Use Only)

Date: 9/14/89 Rev.: 1

MSDS CCA

Components (Percent)

Alloy	Copper	Zirconium	Tin	Manganese	Silicon	Cadmium	Chromium
150	REM	*1	-	-	-	-	-
1622, 165	REM	-	*1	-	-	.6-1.2	-
189, 1895	REM	-	*1	*1	*1	-	-
1814, 18150	REM	*1	-	-	-	-	.5-1.5
182	REM	-	-	-	-	-	.8-1.2
18135	REM	-	-	-	-	.2-.6	.2-.6

Alloy	Copper	Phosphorus	Tellurium	Sulfur	Silver	Zinc	Lead
101, 102, 110	100	-	-	-	-	-	-
103, 122	REM	*1	-	-	-	-	-
104, 105, 107	REM	-	-	-	*1	-	-
1450, 1455, 1457	REM	*1	*1	-	-	-	-
147	REM	-	-	*1	-	-	-
1870, 1875	REM	-	-	-	-	-	.8-1.2
210, 220, 226	REM	-	-	-	-	4-14	-
230, 234, 240	REM	-	-	-	-	14-21.5	-
260, 270, 272	REM	-	-	-	-	28.6-38	-

Alloy	Copper	Zinc	Lead	Tin	Phosphorus	Nickel	Tellurium
314, 316	REM	6.5-12.5	1.3-2.5	-	-	.7-1.2	-
318	87-91	REM	-	-	*1	.7-1.2	*1
340, 344, 345	60-65	REM	.5-2.5	-	-	-	-
350, 353, 360	60-63	REM	.8-3.7	-	-	-	-
377, 365, 3658	55-60.5	REM	1.5-3.8	-	-	-	-
462, 464, 485	REM	35-41	1.3-2.2	.5-1.0	-	-	-
507, 544	REM	0-4.5	0-4.5	1.5-4.5	*1	-	-

Alloy	Copper	Zinc	Manganese	Nickel	Silicon	Aluminum
610, 6101	REM	-	-	-	-	7.0-8.5
634, 642	REM	-	-	-	.25-2.2	2.6-8.5
647, 651	REM	-	*1	1.6-2.2	.4-1.3	-

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Alloy	Copper	Zinc	Lead	Tin	Iron	Manganese	Silicon
675, 676	57-60	REM	-	.5-1.5	.4-2.0	*1	-
655, 656, 651	REM	0-1	0-.2	-	-	.5-1.4	2.8-3.6
6733	60-63	REM	.4-1.0	-	-	2.0-2.5	6.1-5



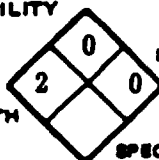
OCEANSM Network

EMERGENCY PHONE (203) 356-2345

Olin Corporation, 120 Long Ridge Road

Stamford, Connecticut 06904

FLAMMABILITY



REACTIVITY

HEALTH

HAZARD RATING

SPECIAL

MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS		
Copper Alloy, High Residual Deoxidized Phosphorous Tubing, ingot, plate		
CHEMICAL FAMILY	FORMULA	TRADE NAME
Copper		Copper Alloy DHP
DESCRIPTION		CAS NO.
Metal		

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE	
Where copper metal is fine cut, avoid breathing dust or fumes. Do not take internally.	
CORROSIVE ACTION ON MATERIALS (Metals, Plastic, Rubber, Etc.)	
PROTECTIVE EQUIPMENT	VENTILATION REQUIREMENTS
Eyes (Dust) Goggles Gloves Other	As required to keep airborne concentrations below TLV.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROX. %	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper		Dust 1.0 mg/m ³ Fume 0.1 mg/m ³			Gastro-intestinal

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not METHOD Applicable	OSHA CLASSIFICATION	FLAMMABLE EXPLOSIVE LIMITS	LOWER	UPPER
EXTINGUISHING MEDIA				
Not Applicable				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES				
Not Applicable				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE	
Copper, dust 1 mg/m ³ , Fume 0.2 mg/m ³ (ACGIH 1983)	
SYMPTOMS OF OVER EXPOSURE	
Dust and fume, sneezing, congestion, metallic taste, gastro-intestinal distress, chills, fever	
EMERGENCY FIRST-AID PROCEDURES	
SKIN	Flush with water for 15 minutes, call a physician.
EYES	Flush with water for 15 minutes, call a physician.
INGESTION	Drink water, induce vomiting by sticking finger down throat, call a physician.
INHALATION	Remove victim to fresh air, call a physician.

TRW-00775

0908-2141

Chemical Copper Alloy DHP

CAS No.

CHEMICAL NAME Copper Alloy DHP

SECTION VI - TOXICOLOGY (Product)

ACUTE ORAL LD 50	CARCINOGENIC	Not known to be carcinogenic
TD _{LO} Copper 120 mg kg (human)	MUTAGENIC	Not known to be mutagenic
ACUTE DERMAL LD 50	EYE IRRITATION	Dust is irritant
ACUTE INHALATION LC 50	PRIMARY SKIN IRRITATION	Dust is irritating
PRINCIPAL ROUTES OF ABSORPTION		
Inhalation of dust or fume		
EFFECTS OF ACUTE EXPOSURE		
Congestion, gastro-intestinal distress, chills, fever		
EFFECTS OF CHRONIC EXPOSURE		
May cause liver, kidney or spleen damage, anemia		

SECTION VII - SPILL OR LEAKAGE PROCEDURES (Control Procedures)

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Dust or fume - Wear NIOSH/MSHA approved dust and fume respirator. Follow OSHA regulations for respirator use. (See 29 CFR 1910.134). Shovel or sweep up and place in an approved DOT container and seal. Wash all contaminated clothing before reuse.

WASTE DISPOSAL METHOD

Dispose of contaminated product and materials used in cleaning up spills or leaks in a manner approved for this material. Consult appropriate federal, state and local regulatory agencies to ascertain proper disposal procedures.

SECTION VIII - REACTIVITY DATA

STABLE	X UNSTABLE	AT _____ °C _____ °F	HAZARDOUS POLYMERIZATION	MAY OCCUR
				WILL NOT OCCUR <input checked="" type="checkbox"/>
CONDITIONS TO AVOID				
INCOMPATIBILITY (Materials To Avoid)				
Dust and fume - acetylene, chlorine				
HAZARDOUS DECOMPOSITION PRODUCTS				
Copper fume				

SECTION IX - PHYSICAL DATA

MELTING POINT	1949°F	VAPOR PRESSURE		VOLATILES
BOILING POINT		SOLUBILITY IN WATER	Insoluble	EVAPORATION RATE
SPECIFIC GRAVITY (H ₂ O = 1)		pH		VAPOR DENSITY (Air = 1)
DENSITY	0.323 pounds/m ³			

INFORMATION FURNISHED BY:

A. L. Gaudreau
(203) 789-5434

DATE

July 30, 1984

Department of Environmental Hygiene and Toxicology



CORPORATION

120 Long Ridge Road, Stamford, Connecticut 06904

OCEANSM Network

EMERGENCY PHONE (203) 356-2345

0908-2142

TRW-00776

Copy
D. Borsuk
9/6/84

U.S. DEPARTMENT OF LABOR
Occupational Safety & Health Administration
MATERIAL SAFETY DATA SHEET

SECTION I	
MANUFACTURER'S NAME Frederick Gum Chemical Company Inc	EMERGENCY TELEPHONE NO. 401-232-0606
ADDRESS (Number, Street, City, State, and ZIP Code) 20 Industrial Drive Smithfield RI 02911	
CHEMICAL NAME AND SYNONYMS Metals	TRADE NAME AND SYNONYMS Copper Anodes
CHEMICAL FAMILY Metals	FORMULA Cu

SECTION II HAZARDOUS INGREDIENTS					
PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV (Units)
Not applicable					

SECTION III PHYSICAL DATA			
BOILING POINT (°F.)	4703 F	SPECIFIC GRAVITY (H ₂ O = 1)	8.93 @ 20 C
VAPOR PRESSURE (mm Hg.)	10 mm @ 1879 C	PERCENT VOLATILE BY VOLUME (%)	NA
VAPOR DENSITY (AIR = 1)	NA	EVAPORATION RATE (_____ = 1)	NA
SOLUBILITY IN WATER	insoluble		
APPEARANCE AND ODOR	Solid metal, copper colored		

SECTION IV FIRE AND EXPLOSION HAZARD DATA			
FLASH POINT (Method used)	FLAMMABLE LIMITS	Let	Uet
NA			
EXTINGUISHING MEDIA	NA		
SPECIAL FIRE FIGHTING PROCEDURES	NA		
UNUSUAL FIRE AND EXPLOSION HAZARDS			
No unusual hazards, will react as most metals.			

TRW-00777

The data in this Material Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process.

0908-2143

SECTION V HEALTH HAZARD DATA	
THRESHOLD LIMIT VALUE	NA
EFFECTS OF OVEREXPOSURE	Not applicable in manufactured state, only if transferred to a metallic dust or fume.
EMERGENCY AND FIRST AID PROCEDURES	NA

SECTION VI REACTIVITY DATA			
STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	
INCOMPATIBILITY (Materials to avoid)		Not compatible with organic acids or acetylene	
HAZARDOUS DECOMPOSITION PRODUCTS NA			
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	XX	

SECTION VII SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	
No special requirements	
WASTE DISPOSAL METHOD	
Recycle material	

SECTION VIII SPECIAL PROTECTION INFORMATION			
RESPIRATORY PROTECTION (Specify type) NA			
VENTILATION	LOCAL EXHAUST	NA	SPECIAL NA
	MECHANICAL (General)	NA	OTHER NA
PROTECTIVE GLOVES NA		EYE PROTECTION NA	
OTHER PROTECTIVE EQUIPMENT NA			

SECTION IX SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING	
Keep away from organic or acetylene during handling and storing	
OTHER PRECAUTIONS	
NA	

TRW-00778



Product Name:	TRU-PLATE 051220001100327	Emergency Phone No.:	216/441-4900
Plant Address:	2910 HARVARD AVENUE	CLEVELAND, OH 44105	Chemtrec Phone No. 800/424-9300
Prepared By:	TSCA COORDINATOR	Issue Date:	10/90
		Revised Date:	5/91

Material	%	TLV	C.A.S. #	Expos. Category
COPPER SULFATE [SARA 313 CHEMICAL]	35-45	1*	7758-99-8	NO
		mg/m ³		
*AS COPPER				

Boiling Point:	NA	Freezing Point:	NA	Specific Gravity:	UK	pH:	NA
Vapor Pressure at 20° C:	NA	Vapor Density (Air = 1):	NA	% Volatiles by Volume:	NA	Odor:	NONE
Evaporation Rate (Butyl Acetate = 1)	NA			Solubility in Water:	APPRECIABLE		
Appearance and Form:	LIGHT BLUE-WHITE CRYSTALS						

Flash Point:	NA	Flammable Limits in Air: Upper: NA Lower:
Test Method:	NA	
Extinguishing Media:	NA	
Special Fire Fighting Procedures:	NA	
Unusual Fire and Explosion Hazards:	NONE	TRW-00779
DOT Classification:	CLASS 9 UN-3077	Note: UK = Unknown NA = Not Applicable

HEALTH HAZARD DATA

Effects of Overexposure and Primary Entries to Body:

PRIMARY ENTRY THROUGH CONTACT.
MAY IRRITATE SKIN, EYES, UPPER RESPIRATORY TRACT.
CHRONIC: COULD CAUSE BLOOD DAMAGE

Emergency and First Aid Procedures:

FLUSH SKIN WITH WATER.
FLUSH EYES WITH WATER FOR 15 MINUTES.
IF ANY IRRITATION PERSISTS, SEE A PHYSICIAN.

REACTIVITY DATA

☒ Stable

☐ Unstable

Conditions to Avoid:

Incompatibility — Materials to Avoid:

NA

Hazardous Decomposition Products:

OXIDES OF SULFUR

Hazardous Polymerization:

☐ May Occur

☒ Will Not Occur

SPILL OR LEAK PROCEDURES

Spills:

SCOOP, VACUUM UP

Waste Disposal Methods:

LANDFILL

FOLLOW ALL LOCAL, STATE AND FEDERAL REGULATIONS.

SPECIAL PROTECTION INFORMATION

Respirator:

IF TLV IS EXCEEDED, MUST BE NIOSH OR MSHA APPROVED.

Ventilation:

SUFFICIENT TO KEEP BELOW TLV LIMIT

Gloves:

RUBBER

Eye and Face:

SAFETY GLASSES

Other:

SUFFICIENT TO PREVENT SKIN CONTACT

Handling and Storage:

STORE IN A COOL, DRY AREA

THIS PRODUCT SAFETY DATA SHEET IS OFFERED SOLELY FOR YOUR INFORMATION, CONSIDERATION AND INVESTIGATION.

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TRW-00780

Copper Sulfate Solution

Occupational Safety and Health Administration

MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing,
Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME HARSTAN CHEMICAL CORPORATION		EMERGENCY TELEPHONE NO. 212-435-8225-6-7-8
ADDRESS (Number, Street, City, State, and ZIP Code) 1247 38th Street, Brooklyn, N. Y. 11218		
CHEMICAL NAME AND SYNONYMS Copper Sulfate Solution		TRADE NAME AND SYNONYMS
CHEMICAL FAMILY Salts	FORMULA CuSO₄	

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV (Units)
Copper Sulfate Pentahydrate				22.8	
Sulfuric Acid				2.2	
Balance water				75.0	

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	N.A.	SPECIFIC GRAVITY (H ₂ O=1)	1.164
VAPOR PRESSURE (mm Hg.)	N.A.	PERCENT VOLATILE BY VOLUME (%)	N.A.
VAPOR DENSITY (AIR=1)	N.A.	EVAPORATION RATE (_____=1)	N.A.
SOLUBILITY IN WATER	complete		
APPEARANCE AND ODOR blue liquid, odorless			

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	NONE	FLAMMABLE LIMITS	LeI	UeI
EXTINGUISHING MEDIA	NONE			
SPECIAL FIRE FIGHTING PROCEDURES	NONE			
UNUSUAL FIRE AND EXPLOSION HAZARDS	NONE			

TRW-00781

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

N.A.

EFFECTS OF OVEREXPOSURE

Mild skin irritant

EMERGENCY AND FIRST AID PROCEDURES

Flush with water. If swallowed, induce vomiting. If splashed in eyes, rinse thoroughly.

SECTION VI - REACTIVITY DATA

STABILITY

UNSTABLE

CONDITIONS TO AVOID

STABLE

X

INCOMPATIBILITY (Materials to avoid)

None

HAZARDOUS DECOMPOSITION PRODUCTS

None

HAZARDOUS
POLYMERIZATION

MAY OCCUR

CONDITIONS TO AVOID

WILL NOT OCCUR

X

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Use usual clean up procedures, Flush and mop up.

WASTE DISPOSAL METHOD

Follow local regulations.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)

VENTILATION

LOCAL EXHAUST

SPECIAL

MECHANICAL (General)

General Ventilation

OTHER

PROTECTIVE GLOVES

Rubber gloves

EYE PROTECTION

Face shield

OTHER PROTECTIVE EQUIPMENT

Rubber apron

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Store at moderate temperatures in closed containers.

OTHER PRECAUTIONS

None

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved
OMB No. 44-R1387

MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing,
Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME Welding Machinery, Inc.		EMERGENCY TELEPHONE NO. (212) 369-9100
ADDRESS (Number, Street, City, State, and ZIP Code) 47-16 Ausrel Place, Long Island City, New York 11101		
CHEMICAL NAME AND SYNONYMS		TRADE NAME AND SYNONYMS Welding Flux 0527, T327
CHEMICAL FAMILY Copper Sulphate-Inorganic Salt Mixture	FORMULA CuSO₄ Mixture	

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV (Units)

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)		SPECIFIC GRAVITY (H ₂ O=1)	
VAPOR PRESSURE (mm Hg.)		PERCENT. VOLATILE BY VOLUME (%)	
VAPOR DENSITY (AIR=1)		EVAPORATION RATE (_____ =1)	
SOLUBILITY IN WATER			
APPEARANCE AND ODOR		Bluish to Greenish granular mixture.	

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	Lel	Uel
EXTINGUISHING MEDIA			
SPECIAL FIRE FIGHTING PROCEDURES			
UNUSUAL FIRE AND EXPLOSION HAZARDS			

TRW-00783

SECTION V - HEALTH HAZARD DATA	
THRESHOLD LIMIT VALUE	1 MG/M ³ as copper sulphate.
EFFECTS OF OVEREXPOSURE	May cause skin and eye irritation.
EMERGENCY AND FIRST AID PROCEDURES	
Flush affected area thoroughly with clean water. For eyes, flush thoroughly with clean water for 15 minutes. Get medical attention.	

SECTION VI - REACTIVITY DATA			
STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	
INCOMPATABILITY (Materials to avoid)			
HAZARDOUS DECOMPOSITION PRODUCTS			
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII - SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	
Sweep up and package	
WASTE DISPOSAL METHOD	
Dispose of salts and solutions in accordance with local regulations for the treatment of copper containing wastes.	

SECTION VIII - SPECIAL PROTECTION INFORMATION		
RESPIRATORY PROTECTION (Specify type)		
Approved dust respirator		
VENTILATION	LOCAL EXHAUST	SPECIAL
	Yes	
	MECHANICAL (General)	OTHER
	Yes	
PROTECTIVE GLOVES		EYE PROTECTION
Rubber or plastic gloves or gauntlets		Chemical goggles
OTHER PROTECTIVE EQUIPMENT		
Full cover work or chemical resistant clothes.		

SECTION IX - SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING	
Store in a dry place. Keep container closed when not in use.	
OTHER PRECAUTIONS	

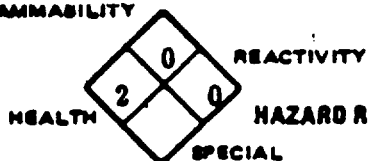


EMERGENCY PHONE (203) 356-2345

Olin Corporation, 120 Long Ridge Road

Stamford, Conn. 06904

FLAMMABILITY



MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS Copper, deoxidized, Low Phosphorous (DLP)		
CHEMICAL FAMILY Copper	FORMULA	TRADE NAME Alloy 120
DESCRIPTION Metal		CAS NO.

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Avoid breathing dust or fumes. Do not take internally.	
CORROSIVE ACTION ON MATERIALS (Metals, Plastics, Rubber, Etc.)	
PROTECTIVE EQUIPMENT Eyes (Dust) Goggles Gloves Other	VENTILATION REQUIREMENTS As required to keep airborne concentrations below TLV.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROX. %	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper		Dust 1.0 mg/m ³ Fume 0.1 mg/m ³			Gastro-intestinal

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not METHOD Applicable	OSHA CLASSIFICATION	FLAMMABLE EXPLOSIVE LIMITS	LOWER	UPPER
EXTINGUISHING MEDIA Not Applicable				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Not Applicable				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE Copper, dust 1 mg/m ³ , Fume 0.2 mg/m ³ (ACGIH 1983)	
SYMPTOMS OF OVER EXPOSURE Dust and fume, sneezing, congestion, metallic taste, gastro-intestinal distress, chills, fever	
EMERGENCY FIRST-AID PROCEDURES	
SKIN	Flush thoroughly with water.
EYES	Flush with water for 15 minutes, call a physician.
INGESTION	Drink water, induce vomiting by sticking finger down throat, call a physician.
INHALATION	Remove victim to fresh air, call a physician.

TRW-00785

0908-2151

Chemical Alloy 120

CAS No.

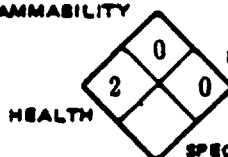


EMERGENCY PHONE (203) 356-2345

Olin Corporation, 120 Long Ridge Road

Stamford, Conn. 06904

FLAMMABILITY



REACTIVITY

HEALTH

HAZARD RATING

SPECIAL

MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS Copper, Electrolytic Tough Pitch (ETP)		
CHEMICAL FAMILY Copper	FORMULA	TRADE NAME Alloy 1092
DESCRIPTION Metal		CAS NO.

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Avoid breathing dust or fumes. Do not take internally.	
CORROSIVE ACTION ON MATERIALS (Metals, Plastic, Rubber, Etc.)	
PROTECTIVE EQUIPMENT Eyes (Dust) Goggles Gloves Other	VENTILATION REQUIREMENTS As required to keep airborne concentrations below TLV.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROX. %	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper		Dust 1.0 mg/m ³ Fume 0.1 mg/m ³			Gastro-intestinal

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD Not Applicable	OSHA CLASSIFICATION	FLAMMABLE EXPLOSIVE LIMITS	LOWER	UPPER
EXTINGUISHING MEDIA Not Applicable				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Not Applicable				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE Copper, dust 1 mg/m ³ , Fume 0.2 mg/m ³ (ACGIH 1983)	
SYMPTOMS OF OVER EXPOSURE Dust and fume, sneezing, congestion, metallic taste, gastro-intestinal distress, chills, fever	
EMERGENCY FIRST-AID PROCEDURES	
SKIN	Flush thoroughly with water.
EYES	Flush with water for 15 minutes, call a physician.
INGESTION	Drink water, induce vomiting by sticking finger down throat, call a physician.
INHALATION	Remove victim to fresh air, call a physician.

Chemical Alloy 1092

CAS No.

CHEMICAL NAME Alloy 1092

SECTION VI - TOXICOLOGY (Product)

ACUTE ORAL LD 50	CARCINOGENIC	Not known to be carcinogenic
TD _{LO} Copper 120 mg/kg (human)	MUTAGENIC	Not known to be mutagenic
ACUTE DERMAL LD 50	EYE IRRITATION	Dust is irritant
ACUTE INHALATION LC 50	PRIMARY SKIN IRRITATION	Dust is irritating
PRINCIPAL ROUTES OF ABSORPTION		
Inhalation of dust or fume		
EFFECTS OF ACUTE EXPOSURE		
Congestion, gastro-intestinal distress, chills, fever		
EFFECTS OF CHRONIC EXPOSURE		
May cause liver, kidney or spleen damage, anemia		

SECTION VII - SPILL OR LEAKAGE PROCEDURES (Control Procedures)

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Dust or fume - Wear NIOSH/MSHA approved dust and fume respirator. Follow OSHA regulations for respirator use. (See 29 CFR 1910.134). Shovel or sweep up and place in an approved DOT container and seal. Wash all contaminated clothing before reuse.

WASTE DISPOSAL METHOD

Dispose of contaminated product and materials used in cleaning up spills or leaks in a manner approved for this material. Consult appropriate federal, state and local regulatory agencies to ascertain proper disposal procedures.

SECTION VIII - REACTIVITY DATA

STABLE	<input checked="" type="checkbox"/> UNSTABLE	AT _____ °C _____ °F	HAZARDOUS POLYMERIZATION	MAY OCCUR
				WILL NOT OCCUR <input checked="" type="checkbox"/>
CONDITIONS TO AVOID				
INCOMPATIBILITY (Reagents To Avoid)			Dust and fume - acetylene, chlorine	
HAZARDOUS DECOMPOSITION PRODUCTS			Copper fume	

SECTION IX - PHYSICAL DATA

MELTING POINT	1949°F	VAPOR PRESSURE		VOLATILES
BOILING POINT		SOLUBILITY IN WATER	Insoluble	EVAPORATION RATE
SPECIFIC GRAVITY (H ₂ O = 1)		SM		VAPOR DENSITY (Air = 1)
DENSITY	.322 pounds/m ³			

INFORMATION FURNISHED BY:

A. L. Gaudreau
(203) 789-5434

DATE

September 4, 1984

Department of Environmental Hygiene and Toxicology

Olin

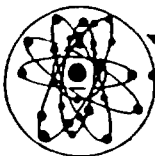
CORPORATION

120 Long Ridge Road, Stamford, Connecticut 06904

EMERGENCY PHONE (203) 356-2345

0908-2153

TRW-00787

**HUSSEY COPPER LTD.**BY: HUSSEY COPPER CORP., GENERAL PARTNER
LEETSDALE, PA 15056

M.S.D.S. HC-85-700

DATE: 3/26/85

REV. DATE: 4/21/86

REVISION NO.: 2

MATERIAL SAFETY DATA SHEET**SECTION I**

MANUFACTURER'S NAME: HUSSEY COPPER LTD.
ADDRESS: Washington Street LEETSDALE, PA. 15056
EMERGENCY PHONE NO.: 412-857-4200
CHEMICAL NAME AND SYNONYMS: **COPPER ;NICKEL**
TRADE NAME AND SYNONYMS: Cupro Nickel, 90/10, 70/30, CDA Alloy 706, 715

CHEMICAL FAMILY: COPPER AND NICKEL

SECTION II - HAZARDOUS INGREDIENTS

INGREDIENT	PERCENT		CAS NO.	OSHA-PEL/ACGIH-TLV
	706	715		
Copper	86.5 min	65.0 min	7440-50-8	Exposure Levels See Section V
Nickel	9.0-11.0	29.0-32.0	7440-02-0	
Iron	1.0-1.75	1.0 max	(IRON) OXIDE 1309-37-1	
Manganese	.75 max	.25-1.0	7439-96-5	

HAZARDOUS MIXTURES OF OTHERS LIQUIDS, SOLIDS, OR GASES:

If exposure to copper and nickel dust/fume is kept below Permissible Exposure Limits (PEL)/Threshold Limit Value (TLV) iron and Manganese along with other trace impurities should not pose any health risk.

SECTION III - PHYSICAL DATA

MELTING	Alloy 706/ 2010° F	Alloy 715/ 2140° F
Vapor Pressure (mm Hg.)	Not Applicable	Not Applicable
Solubility in Water	negligible	negligible
Specific Gravity (H²O = 1)	8.94	8.94

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used)	Not applicable*	
Extinguishing Media	Not Applicable	0908-2154
Special Fire Fighting Procedures	Not applicable	TRW-00788
Unusual Fire and Explosion Hazards	Not applicable	

* Under normal conditions. Heavy concentrations of fine copper dust may cause flash fire if exposed to ignition source.

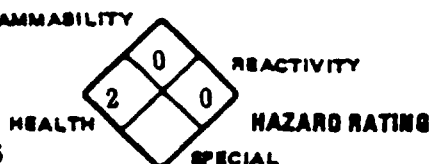
OCEANSM Network

EMERGENCY PHONE (203) 356-2345

Olin Corporation, 120 Long Ridge Road

Stamford, Connecticut 06904

FLAMMABILITY



MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS Copper Nickel 15%		
CHEMICAL FAMILY Copper	FORMULA	TRADE NAME ALLOY 709
DESCRIPTION Metal	CAS NO.	

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Precautions needed for abrasive operations and melting only. Do not get in eyes, on skin or on clothing. Do not take internally. Avoid breathing dust or fumes.	
CORROSIVE ACTION ON MATERIALS (Metals, Plastics, Rubber, Etc.)	
PROTECTIVE EQUIPMENT Eyes Dust and Fume - Goggles Gloves None necessary Other None necessary	VENTILATION REQUIREMENTS Dust or fume - Local exhaust or general ventilation required as dictated by airborne concentrations.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROX. %	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper		Dust 1 mg/m ³ Fume 0.1 mg/m ³			Dust and fume - chills, gastro-intestinal distress
Nickel		Dust 1 mg/m ³			Dust or metal - dermatitis

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD Not Applicable	OSHA CLASSIFICATION Not Applicable	FLAMMABLE EXPLOSIVE LIMITS	LOWER	UPPER
EXTINGUISHING MEDIA Not Applicable				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved self-contained breathing apparatus where this material is involved in a fire.				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE None established.	
SYMPTOMS OF OVER EXPOSURE Dust or Fume: Sneezing, congestion, metallic taste, nausea, chills, dermatitis	
SKIN	Dust or fume: EMERGENCY FIRST-AID PROCEDURES Flush thoroughly with water.
EYES	Dust or fume: Flush with water for 15 minutes, call a physician.
INGESTION	Dust or fume: Drink water, induce vomiting by sticking finger down throat, call a physician.
INHALATION	Dust or fume: Remove victim to fresh air, call a physician.

Chemical ALLOY 709

CAS No.

TRW-00789

0908-2155

CHEMICAL NAME ALLOY 709**SECTION VI - TOXICOLOGY (Product)**

ACUTE ORAL Lowest Published Lethal Dose - (Copper) 120 mg/kg (human)	CARCINOGENIC Dust may cause respiratory tract cancer
ACUTE DERMAL LD 50 No available data	MUTAGENIC Not known to be mutagenic
ACUTE INHALATION LD 50 No available data	EYE IRRITATION Dust and fume - irritant
	PRIMARY SKIN IRRITATION Dust is irritant

PRINCIPAL ROUTES OF ABSORPTION

Inhalation, ingestion of metal, dust or fume

EFFECTS OF ACUTE EXPOSURE

Dust or fume: Congestion, gastro-intestinal distress, chills, dermatitis

EFFECTS OF CHRONIC EXPOSURE

Dust and fume: May cause kidney, liver or spleen damage, anemia

SECTION VII - SPILL OR LEAKAGE PROCEDURES (Control Procedures)**STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED**

Dust or fume - Wear NIOSH/MSHA approved dust and fume respirator. Follow OSHA regulations for respirator use. (See 29 CFR 1910.134). Shovel or sweep up and place in an approved DOT container and seal. Wash all contaminated clothing before reuse.

In the event of a large spill use the emergency telephone number shown on the front of this sheet.

WASTE DISPOSAL METHOD

Dispose of contaminated product and materials used in cleaning up spills or leaks in a manner approved for this material. Consult appropriate federal, state and local regulatory agencies to ascertain proper disposal procedures.

SECTION VIII - REACTIVITY DATA

STABLE <input checked="" type="checkbox"/> UNSTABLE <input type="checkbox"/>	AT _____ °C _____ °F	HAZARDOUS POLYMERIZATION	MAY OCCUR <input type="checkbox"/> WILL NOT OCCUR <input checked="" type="checkbox"/>
CONDITIONS TO AVOID	Presence of carbon monoxide during melting		
INCOMPATIBILITY (Materials To Avoid)	Dust and fume - acetylene, chloride		
HAZARDOUS DECOMPOSITION PRODUCTS	Copper fume, nickel carbonyl		

SECTION IX - PHYSICAL DATA

MELTING POINT	VAPOR PRESSURE	VOLATILES
BOILING POINT	SOLUBILITY IN WATER	EVAPORATION RATE
SPECIFIC GRAVITY (H ₂ O = 1)	PH	VAPOR DENSITY (Air = 1)

INFORMATION FURNISHED BY:

A. L. Gaudreau
(203) 789-5434

DATE October 19, 1984

Department of Environmental Hygiene and Toxicology

Olin CORPORATION

120 Long Ridge Road, Stamford, Connecticut 06904

OCEANSM Network

EMERGENCY PHONE (203) 356-2345

0908-2156

TRW-00790



OCEAN® Network
EMERGENCY PHONE 1-800-OLIN-911

MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS Copper Nickel 20%		
CHEMICAL FAMILY Copper	FORMULA Mixture	TRADE NAME ALLOY 710
DESCRIPTION Metal		CAS NO. Not assigned/mixture

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Precautions needed for abrasive, melting or other operations generating a dust or fume. Do not get dust or fume in eyes, on skin or on clothing. Do not take internally. Wash thoroughly with soap and water before eating or smoking. Avoid breathing dust or fumes.	
PROTECTIVE EQUIPMENT Eyes Goggles Gloves Impervious Other NIOSH/MSHA approved high efficiency particulate respirator if excessive dusting/fumes occur	VENTILATION REQUIREMENTS As required to keep airborne concentrations below the TLV for copper, zinc and nickel.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL		OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper	Dust	1 mg/m ³	TDLO 120 ug/kg (human) No data	No data	Metal fume fever, respiratory irritation
	Fume	0.1 mg/m ³			
Zinc	Fume	5 mg/m ³	No data	TCLO 124 mg/m ³ /50 min.(hum.)	Metal fume fever
Nickel	Dust	1 mg/m ³	No data	No data	Dermatitis, suspect carcinogen

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD Not Applicable	OSHA CLASSIFICATION Non-combustible solid	FLAMMABLE EXPLOSIVE LIMITS	LOWER N/A	UPPER N/A
EXTINGUISHING MEDIA Use extinguishing media suitable for surrounding materials.				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved positive pressure self-contained breathing apparatus when any material is involved in a fire.				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE None established for mixture (copper fume 0.2 mg/m ³ , zinc fume 5 mg/m ³ , nickel 1 mg/m ³ ACGIH 1985-86).	
SYMPTOMS OF OVER EXPOSURE Dust and fume - sneezing, congestion, metallic taste, nausea, chills, fever, dermatitis.	
SKIN	Dust or fume: Wash with soap and water before eating or smoking. If an irritation develops, call a physician.
EYES	Dust or fume: Flush thoroughly with water for 15 minutes. Call a physician.
INGESTION	Dust: Not a likely route of exposure. If ingested, call a physician.
INHALATION	Dust or Fume: Remove victim to fresh air. Call a physician.

RW-00791

0908-2157

Chemical

CAS No.

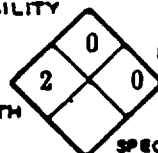


OCEANSM Network

EMERGENCY PHONE (203) 356-2345

Olin Corporation, 120 Long Ridge Road
Stamford, Connecticut 06904

FLAMMABILITY



REACTIVITY

HEALTH

HAZARD RATING

SPECIAL

MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS Copper Nickel 25%		
CHEMICAL FAMILY Copper	FORMULA	TRADE NAME ALLOY 713
DESCRIPTION Metal		CAS NO.

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Precautions needed for abrasive operations and melting only. Do not get in eyes, on skin or on clothing. Do not take internally. Avoid breathing dust or fumes.	
CORROSIVE ACTION ON MATERIALS (Metals, Plastic, Rubber, Etc.)	
PROTECTIVE EQUIPMENT	VENTILATION REQUIREMENTS
Eyes: Dust and Fume - Goggles Gloves: None necessary Other: None necessary	Dust or fume - Local exhaust or general ventilation required as dictated by airborne concentrations.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROX. %	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper		Dust 1 mg/m ³ Fume 0.1 mg/m ³			Dust and fume - chills, gastro-intestinal distress
Nickel		Dust 1 mg/m ³			Dust or metal - dermatitis

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD Not Applicable	OSHA CLASSIFICATION Not Applicable	FLAMMABLE EXPLOSIVE LIMITS	LOWER	UPPER
EXTINGUISHING MEDIA Not Applicable				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved self-contained breathing apparatus where this material is involved in a fire.				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE None established.	
SYMPTOMS OF OVER EXPOSURE Dust or Fume: Sneezing, congestion, metallic taste, nausea, chills, dermatitis	
EMERGENCY FIRST-AID PROCEDURES	
SKIN Dust or fume: Flush thoroughly with water.	
EYES Dust or fume: Flush with water for 15 minutes, call a physician.	
INGESTION Dust or fume: Drink water, induce vomiting by sticking finger down throat, call a physician.	
INHALATION Dust or fume: Remove victim to fresh air, call a physician.	

CHEMICAL NAME ALLOY 713**SECTION VI - TOXICOLOGY (Product)**

ACUTE ORAL	Lowest Published Lethal Dose - (Copper) 120 mg/kg (human)	CARCINOGENIC	Dust may cause respiratory tract cancer
ACUTE DERMAL LD 50	No available data	MUTAGENIC	Not known to be mutagenic
ACUTE INHALATION LC 50	No available data	EYE IRRITATION	Dust and fume - irritant
		PRIMARY SKIN IRRITATION	Dust is irritant

PRINCIPAL ROUTES OF ABSORPTION

Inhalation, ingestion of metal, dust or fume

EFFECTS OF ACUTE EXPOSURE

Dust or fume: Congestion, gastro-intestinal distress, chills, dermatitis

EFFECTS OF CHRONIC EXPOSURE

Dust and fume: May cause kidney, liver or spleen damage, anemia

SECTION VII - SPILL OR LEAKAGE PROCEDURES (Control Procedures)**STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED**

Dust or fume - Wear NIOSH/MSHA approved dust and fume respirator. Follow OSHA regulations for respirator use. (See 29 CFR 1910.134). Shovel or sweep up and place in an approved DOT container and seal. Wash all contaminated clothing before reuse.

In the event of a large spill use the emergency telephone number shown on the front of this sheet.

WASTE DISPOSAL METHOD

Dispose of contaminated product and materials used in cleaning up spills or leaks in a manner approved for this material. Consult appropriate federal, state and local regulatory agencies to ascertain proper disposal procedures.

SECTION VIII - REACTIVITY DATA

STABLE	X UNSTABLE	AT	°C	°F	HAZARDOUS POLYMERIZATION	MAY OCCUR
						WILL NOT OCCUR X
CONDITIONS TO AVOID	Presence of carbon monoxide during melting					
INCOMPATIBILITY (MAY BE TO AVOID)	Dust and fume - acetylene, chloride					
HAZARDOUS DECOMPOSITION PRODUCTS	Copper fume, nickel carbonyl					

SECTION IX - PHYSICAL DATA

MELTING POINT	2188	VAPOR PRESSURE	VOLATILES
BOILING POINT		SOLUBILITY IN WATER	EVAPORATION RATE
SPECIFIC GRAVITY (H ₂ O = 1)		SM	VAPOR DENSITY (AIR = 1)
DENSITY	.323 lbs/m ³		

INFORMATION FURNISHED BY:

GRB
A. L. Gaudreau
(203) 789-5434

DATE

October 19, 1984

Department of Environmental Hygiene and Toxicology

Olin

CORPORATION

120 Long Ridge Road, Stamford, Connecticut 06904

OCEANSM Network

EMERGENCY PHONE (203) 356-2345

0908-2159

TRW-00793

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved
OMB No. 44-R1387

MATERIAL SAFETY DATA SHEET

SECTION I

MANUFACTURER'S NAME THE COSMIN CORPORATION	EMERGENCY TELEPHONE NO. 512/828-9261
ADDRESS (Number, Street, City, State, and ZIP Code) 1635 N.E. Loop 410, Ste. #910, San Antonio, Texas 78209	
CHEMICAL NAME AND SYNONYMS Ferrous Sulfate Heptahydrate or Iron (II) Sulfate	TRADE NAME AND SYNONYMS Copperas
CHEMICAL FAMILY Inorganic Salt	FORMULA FeSO₄ · 7H₂O

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		

OTHERS **Ferrous Sulfate is not listed as hazardous by the U.S. Department of Transportation.**

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES

Ferrous Sulfate	CAS#7782-63-0	(ACGIH)	54.6	1 mg Fe/m³
	TSCA Registry #N085100	EPA: 40 CFR	116.4	Haz. Sub.
Contains small amounts of free sulfuric acid		(ACGIH)	1	1 mg/m³
	CAS#7664-93-9			

SECTION III - PHYSICAL DATA

Decomposes at 300°C		SPECIFIC GRAVITY (H ₂ O=1)		1.189
On heating loses H ₂ O of hydration, changing to 4H ₂ O, then 1H ₂ O		PERCENT VOLATILE BY VOLUME (%)		0
VAPOR PRESSURE (mm Hg) @ 25°C		Can contain 1-2% free moisture		
VAPOR DENSITY (AIR=1) rel. water vap. dens. @ 25°C		EVAPORATION RATE (Butyl Acetate=1)		1
SOLUBILITY IN WATER % FeSO ₄ · 7H ₂ O @ 25°C		PH (in 10% solution)		3
APPEARANCE AND ODOR Grey-Green Crystals, slight acidic odor or odorless				

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	not combustible	FLAMMABLE LIMITS	NA	LeI	Uel
EXTINGUISHING MEDIA	no fire hazard				
SPECIAL FIRE FIGHTING PROCEDURES	none				

UNUSUAL FIRE AND EXPLOSION HAZARDS **none**

TRW-00794

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE for iron salts, as Fe = 1mg/cu.m. ACGIH (1975)

EFFECTS OF OVEREXPOSURE Dust Inhalation: Nasal irritation; skin contact: mild irritation (16CFR 1500.4 and 16CFR 1500.3.6 (8) & (9); eyes: severe irritant (16CFR 1500.4 & 16CFR 1500.42)

EMERGENCY AND FIRST AID PROCEDURES

Nose, eye & skin contact: flush with copious water.

Ingestion: moderately toxic, lethal dose 5 to 113 gms (Gosselin, III p.153), give milk immediately, induce vomiting & call physician immediately.

SECTION VI - REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	air oxidation

susceptible only to non-hazardous (taking months)

INCOMPATIBILITY (Materials to avoid)

moisture causes non-hazardous caking

HAZARDOUS DECOMPOSITION PRODUCTS

SO₃ if FeSO₄ heated above 300°C

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

If dry: scoop or shovel for removal

If wet: wash to waste water drain leading to neutralization treatment and iron-solid removal.

WASTE DISPOSAL METHOD

If dry: add to other material for sanitary landfill.

If wet: wash to waste water drain & neutralize with lime & treat for iron removal.

Dispose of dewatered solids in landfill.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type) Normally respiratory protection not required. In event of dust, use single filter nose & mouth respirator, MESA-NIOSH approved (MSA dust foe #66 or equivalent)

VENTILATION	LOCAL EXHAUST	SPECIAL
	MECHANICAL (General) as necessary to reduce dust	OTHER

PROTECTIVE GLOVES

may be worn

EYE PROTECTION

safety glasses

OTHER PROTECTIVE EQUIPMENT

none required

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING Avoid skin & eye contact - avoid dust inhalation. Ferrous sulfate is not dangerous and can be handled in bags or in bulk if the same moderate care is taken as with any non-toxic inorganic salt.

OTHER PRECAUTIONS

THE COSMIN CORPORATION

THE CROSSROADS - 1635 N.E. LOOP 410

SAN ANTONIO, TEXAS 78209

512-828-9261

OUT-OF-STATE WATS 800-531-5534

REPRESENTATIVE FERROUS SULFATE HEPTAHYDRATE ANALYSIS

I. $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$ Ferrous Sulfate Heptahydrate 98.5%

Composed of:

Fe (11) Iron (ous) 20.0 - 21.5%

S Sulphur 11.5%

O Oxygen 22.9%

SO_4 Sulfate 34.4% 34.4%

FeSO_4 Ferrous Sulfate Anhydrous 54.4%

H_2O Water (hydrate) 44.0%

II. Other Constituents: 1.5%

MgSO_4 - Magnesium Sulfate 0.6%
 TiO_2 - Titanium Dioxide 0.2%
 MnO - Manganese Oxide 0.1%
 H_2SO_4 - Sulfuric Acid 0.5%
 Fe_2O_3 - Ferric Oxide 0.1%
 Nitrates 0.000%

III. Analysis for Trace Metallic Elements:

As Arsenic .0000%
 Pb Lead .0007%
 Cd Cadmium .0000%
 Hg Mercury .0000%
 Cr Chromium .0001%
 Ba Barium .0000%
 Se Selenium .0000%
 Ag Silver .0000%
 Sb Antimony .0000%
 Zn Zinc .009 %
 Cu Copper .0000%
 Ca Calcium .01 %

IV. Anti-caking Additive:

At the customer's request anti-caking agent may be added up to 1%, increasing the following constituents depending upon the amount added.

Analysis of standard additive:

CaCO_3 Calcium Carbonate 96. %
 MgCO_3 Magnesium Carbonate 3.5%

0908-2162

TRW-00796

MATERIAL SAFETY DATA OCEAN® Network EMERGENCY PHONE 1-800-OLIN-911

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS Cupro Nickel 30%		
CHEMICAL FAMILY Copper	FORMULA Mixture	TRADE NAME Alloy 715
DESCRIPTION Metal		CAS NO. Not assigned/mixture

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Precautions needed for abrasive, melting or other operations generating a dust or fume. Do not get dust or fume in eyes, on skin or on clothing. Do not take internally. Wash thoroughly with soap and water before eating or smoking. Avoid breathing dust or fumes.	
PROTECTIVE EQUIPMENT	VENTILATION REQUIREMENTS
Eyes Goggles Gloves Impervious Other NIOSH/MSHA approved high efficiency particulate respirator if excessive dusting/fumes occur	As required to keep airborne concentrations below the TLV for copper and nickel.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL		OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper	Dust Fume	1 mg/m ³ 0.1 mg/m ³	TD _{LO} = 120 ug/kg (human)	No data	Dust and fume-metal fume fever, respiratory irritation
Nickel	Dust	1 mg/m ³	LD _{LO} = 5 mg/kg (guinea pig)	No data	Dust or metal-dermatitis, suspect carcinogen

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD Not Applicable	OSHA CLASSIFICATION Non-combustible solid	FLAMMABLE EXPLOSIVE LIMITS	LOWER N/A	UPPER N/A
EXTINGUISHING MEDIA Use extinguishing media suitable for surrounding materials.				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved positive pressure self-contained breathing apparatus where any material is involved in a fire.				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE None established for mixture (Copper fume - 0.2 mg/m ³ , Nickel - 1 mg/m ³ ACGIH 1984).	
SYMPTOMS OF OVER EXPOSURE Dust or Fume: Sneezing, congestion, metallic taste, nausea, chills, dermatitis	
SKIN	Dust or fume: Wash with soap and water before eating or smoking. If an irritation develops, call a physician.
EYES	Dust or fume: Flush with water for 15 minutes, call a physician.
INGESTION	Dust: Not a likely route of exposure. If ingested, call a physician.
INHALATION	Dust or Fume: Remove victim to fresh air, call a physician.

TRW-00797

SECTION VI - TOXICOLOGY (Product)

ACUTE ORAL LD 50	No data for alloy	CARCINOGENICITY	Nickel is considered a carcinogen by NTP
ACUTE DERMAL LD 50	No data for alloy	MUTAGENICITY	Not known to be mutagenic
ACUTE INHALATION LC 50	No data for alloy	EYE IRRITATION	Dust and fume - irritant
		PRIMARY SKIN IRRITATION	Dust may be an irritant
PRINCIPAL ROUTES OF ABSORPTION			
Inhalation, dermal exposure to metal dust or fume			
EFFECTS OF ACUTE EXPOSURE Dust or fume: Metal fume fever, respiratory irritation, skin, eye and mucous membrane irritation.			
EFFECTS OF CHRONIC EXPOSURE Dermatitis. Chronic over-exposure may cause kidney and liver effects. Nickel has been associated with lung cancers.			

SECTION VII - SPILL AND LEAKAGE PROCEDURES (Control Procedures)

ACTION FOR MATERIAL RELEASE OR SPILL

Dust or fume - Wear NIOSH/MSHA approved high efficiency particulate respirator. Follow OSHA regulations for respirator use. (See 29 CFR 1910.134). Wear goggles, coveralls, impervious gloves and boots. Shovel or sweep up and place in an appropriate container. Wash all contaminated clothing before reuse.

In the event of a large spill use the emergency telephone number shown on the front of this sheet.

TRANSPORTATION EMERGENCY, CONTACT CHEMTREC 800-424-9300

WASTE DISPOSAL METHOD

Dispose of contaminated product, empty containers and materials used in cleaning up spills or leaks in a manner approved for this material. Consult appropriate federal, state and local regulatory agencies to ascertain proper disposal procedures.

SECTION VIII - SHIPPING DATA

D.O.T. CLASS

Not regulated

SECTION IX - REACTIVITY DATA

STABLE	X UNSTABLE	AT	°C	°F	HAZARDOUS POLYMERIZATION	MAY OCCUR
						WILL NOT OCCUR X
CONDITIONS TO AVOID Presence of carbon monoxide during melting						
INCOMPATIBILITY (Material to Avoid) Dust and fume - acetylene, chloride						
HAZARDOUS DECOMPOSITION PRODUCTS Copper fume, nickel carbonyl						

SECTION X - PHYSICAL DATA

MELTING POINT	2140°F	VAPOR PRESSURE	N/A	VOLATILES	N/A
BOILING POINT	No data	SOLUBILITY IN WATER	Insoluble	EVAPORATION RATE	N/A
SPECIFIC GRAVITY (H ₂ O = 1)	*	pH	N/A	VAPOR DENSITY (Air = 1)	N/A
* DENSITY	.323 lbs/in ³				

INFORMATION FURNISHED BY: Environmental Hygiene
and Toxicology
(203) 789-5436

DATE March 31, 1986

TRW-00798

Department of Environmental Hygiene and Toxicology
(203) 789-5436

Olin CORPORATION

120 Long Ridge Road, Stamford, Connecticut 06904

OCEAN® Network

EMERGENCY PHONE 1-800-OLIN-911



OCEAN® Network
EMERGENCY PHONE 1-800-OLIN-911

MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS Copper, oxygen free		
CHEMICAL FAMILY Copper	FORMULA Mixture	TRADE NAME Alloy 102
DESCRIPTION Red orange metallic solid		CAS NO. Not assigned/mixture

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Precautions needed for abrasive, melting or other operations generating a dust or fume. Do not get dust or fume in eyes, on skin or on clothing. Do not take internally. Wash thoroughly with soap and water before eating or smoking. Avoid breathing dust or fumes.	
PROTECTIVE EQUIPMENT Eyes Goggles Gloves Impervious Other NIOSH/MSHA approved high efficiency particulate respirator if excessive dusting/fumes occurs	VENTILATION REQUIREMENTS As required to keep airborne concentrations of copper below TLV.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper	Dust 1 mg/m ³	TD _{LO} 120 ug/kg (human)	No data	Inhalation - metal fume fever, respiratory tract irritation

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD Not applicable	OSHA CLASSIFICATION Non-combustible solid	FLAMMABLE EXPLOSIVE LIMITS	LOWER N/A	UPPER N/A
EXTINGUISHING MEDIA Use extinguishing media suitable for surrounding materials.				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved positive pressure self-contained breathing apparatus when any material is involved in a fire.				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE Copper; dust - 1 mg/m ³ , fume 0.2 mg/m ³ (ACGIH 1985-86)	
SYMPTOMS OF OVER EXPOSURE Dust and fume: Sneezing, congestion, metallic taste, nausea, chills, fever.	
Dust or fume: Wash with soap and water before eating or smoking. If an irritation develops, call a physician.	
SKIN	EMERGENCY FIRST-AID PROCEDURES
EYES	Dust or fume: Flush thoroughly with water for 15 minutes. Call a physician.
INGESTION	Dust: Not a likely route of exposure. If ingested, call a physician.
INHALATION	Dust or Fume: Remove victim to fresh air. Call a physician.

TRW-00799

0908-2165

Chemical

CAS No.

REV. 2


copper sulfate

(Pg 1 of 2)

Received	S.A.K.	 McGean-Rohco, Inc. 250 Terminal Tower Cleveland, Ohio 44113, 216/621-6425	MATERIAL SAFETY DATA SHEET
NOV 18 1987			
Answered			
Referred to			

Product Name:	Tru-Plate Powdered Copper Chemical 1327	Emergency Phone No.:	216/441-4900
Plant Address:	2910 Harvard Avenue	Cleveland, OH 44109	Chemtrac Phone No.:
			800/424-9300
Prepared By:	TSCA Coordinator	Issue Date:	10/85
		Revised Date:	NA

INGREDIENTS AND HAZARDOUS COMPONENTS

Material	%	TLV	C.A.S. #	Suspect Carcinogen
TRW-MOUNTAINSIDE Copper Sulfate	< 40	1.0	7758-98-7	NA
MSDS CODE # <u>CSO-0246</u>		MG/M ³		
Approved/  for Use				
<u>Signature</u> <u>Date</u>				
REMARKS:				
1. Please ensure each involved person is explained potential				
HAZARD from exposure of this chemical and trained in proper				
handling and/or use, informed of spill procedure and given				
protective equipment/clothing				
prior to his first day of work.				

PHYSICAL DATA

Boiling Point:	Freezing Point:	Specific Gravity:	pH: 1% solution
2. Keep copy of this MSDS in work		UK	mildly acid
Vapor Pressure at 20° C:	Vapor Density (Air = 1):	% Volatiles by Volume:	Odor:
NA	NA	NA	none
Evaporation Rate (Butyl Acetate = 1)	NA	Solubility in Water:	
		soluble	

Appearance and Form:

Light blue - to light green, dry mixture.

FIRE AND EXPLOSION HAZARD DATA

Flash Point:	NA	Flammable Limits in Air:	
Test Method:	NA	% By Volume	Upper: NA
			Lower:
Extinguishing Media:	As necessary for primary cause of fire.		
Special Fire Fighting Procedures:	None		
Unusual Fire and Explosion Hazards:	None		
DOT Classification:	RQ Cupric Sulfate Mixture ORM-E NA 9188		
	Note: UK = Unknown NA = Not Applicable		

TRW-00800

Copper Sulfate (Pg 272)

Powdered Copper Chemical 1327

HEALTH HAZARD DATA

C50-0246

Effects of Overexposure and Primary Entries to Body:

May cause skin irritation.

Emergency and First Aid Procedures:

Flush affected area thoroughly with clean water. For eyes, get medical attention, if irritation is persistent.

REACTIVITY DATA

☒ Stable☐ Unstable

Conditions to Avoid:

Incompatibility — Materials to Avoid:

None

Hazardous Decomposition Products:

May produce oxides of sulfur at very high temperatures.

Hazardous Polymerization:

☐ May Occur☒ Will Not Occur

SPILL OR LEAK PROCEDURES

Spills:

Sweep up and transfer to waste treatment system.

Waste Disposal Methods:

Conform to all federal, state and local regulations for disposal of copper containing wastes.

SPECIAL PROTECTION INFORMATION

Respirator:

Approved dust respirator.

Ventilation:

Mechanical - Sufficient to stay below TLV.

Gloves:

Plastic-
Rubber

Eye and Face:

Goggles

Other:

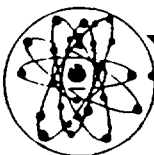
Protective clothing to avoid skin contact.

Handling and Storage:

Protect container from physical damage. Store in a dry area; keep container closed when not in use.

THIS PRODUCT SAFETY DATA SHEET IS OFFERED SOLELY FOR YOUR INFORMATION CONSIDERATION AND INVESTIGATION.

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**HUSSEY COPPER LTD.**BY: HUSSEY COPPER CORP., GENERAL PARTNER
LEETSDALE, PA 15056

M.S.D.S. HC-85-155

DATE: 3/26/85

REV. DATE: 4/21/86

REVISION NO.: 1

MATERIAL SAFETY DATA SHEET**SECTION I**

MANUFACTURER'S NAME: HUSSEY COPPER LTD.
ADDRESS: Washington Street LEETSDALE, PA. 15056
EMERGENCY PHONE NO.: 412-857-4200
CHEMICAL NAME AND SYNONYMS: COPPER
TRADE NAME AND SYNONYMS: SUPER SILVER COPPER CDA ALLOY 155

CHEMICAL FAMILY: COPPER

SECTION II - HAZARDOUS INGREDIENTS

INGREDIENT	PERCENT	CAS NO.	OSHA-PEL/ACGIH-TLV
Base Metal Copper	99.75* MIN	7440-50-8	Exposure Levels See Section V

HAZARDOUS MIXTURES OF OTHERS LIQUIDS, SOLIDS, OR GASES:

If exposure to copper dust/fume is kept below Permissible Exposure Limits (PEL)/
Threshold Limit Value (TLV) all trace elements should not pose any health risk.

* Copper plus silver - 155 copper is expected to contain less than .1% silver.

SECTION III - PHYSICAL DATA

MELTING 1972° F
Vapor Pressure (mm Hg.) Not applicable
Solubility in Water negligible
Specific Gravity (H₂O = 1) 8.9

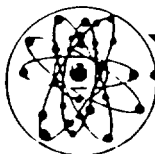
SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used) Not applicable*
Extinguishing Media Not Applicable
Special Fire Fighting Procedures Not applicable
Unusual Fire and Explosion Hazards Not applicable

* Under normal conditions. Heavy concentrations of fine copper dust may cause flash fire

TRW-00802

0908-2168

**HUSSEY COPPER LTD.**BY: HUSSEY COPPER CORP., GENERAL PARTNER
LEETSDALE, PA 15056

M.S.D.S. HC-85-200

DATE: 3/26/85

REV. DATE: 4/21/86

REVISION NO.: 2

MATERIAL SAFETY DATA SHEET**SECTION I**

MANUFACTURER'S NAME: HUSSEY COPPER LTD.
ADDRESS: Washington Street LEETSDALE, PA. 15056
EMERGENCY PHONE NO.: 412-857-4200
CHEMICAL NAME AND SYNONYMS: COPPER/ZINC
TRADE NAME AND SYNONYMS: Gilding, commercial bronze, red brass, low brass, cartridge brass, yellow brass. CDA Alloy 210, 220, 226, 230, 240, 260, 268
CHEMICAL FAMILY: COPPER AND ZINC

SECTION II - HAZARDOUS INGREDIENTS

INGREDIENT	PERCENT	CAS NO.	OSHA-PEL/ACGIH-TLV
Copper	96.0 to 65.0	7440-50-8	Exposure Levels See Section V
Zinc	4.0 to 35.0	7440-66-6	

HAZARDOUS MIXTURES OF OTHERS LIQUIDS, SOLIDS, OR GASES:

If exposure to copper and zinc dust/fume are kept below Permissible Exposure Limits (PEL)/Threshold Limit Value (TLV) all trace elements should not pose any health risk.

SECTION III - PHYSICAL DATA

ALLOY	210	220	226	230	240	260	268
MELTING	1920	1870	1840	1810	1770	1680	1660
Vapor Pressure (mm Hg.)	Not applicable						
Solubility in Water	negligible						
Specific Gravity (H ² O = 1)	8.86	8.80	8.78	8.75	8.67	8.53	8.47

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used)	Not applicable *
Extinguishing Media	Not Applicable
Special Fire Fighting Procedures	Not applicable
Unusual Fire and Explosion Hazards	Not applicable

0908-2169

TRW-00803

* Under normal conditions. Heavy concentrations of fine copper dust may cause flash fire if exposed to ignition source.



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EMERGENCY PHONE 1-800-OLIN-911

MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS Coronze®, Aluminum Bronze		
CHEMICAL FAMILY Copper	FORMULA Mixture	TRADE NAME Alloy 638
DESCRIPTION Red orange metallic solid		CAS NO. Not assigned/mixture

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Precautions needed for abrasive, melting or other operations generating a dust or fume. Do not get dust or fume in eyes, on skin or on clothing. Do not take internally. Wash hands with soap and water before eating or smoking. Avoid breathing dust or fumes.	
PROTECTIVE EQUIPMENT	VENTILATION REQUIREMENTS
Eyes Dust - goggles Gloves Impervious (if necessary) Other NIOSH/MSHA approved high efficiency particulate respirator if excessive dusting/fumes occurs	As required to keep airborne concentrations of copper and aluminum below TLV.

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL		OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper	Dust Fume	1 mg/m ³ 0.1 mg/m ³	TDLO 120 ug/kg (human)	No data	Inhalation - metal fume fever, respiratory tract irritation
Aluminum		None Established	No data	No data	Over-exposure may cause lung fibrosis (Shaver's Disease)

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD Not Applicable	OSHA CLASSIFICATION Non-combustible solid	FLAMMABLE EXPLOSIVE LIMITS	LOWER N/A	UPPER N/A
EXTINGUISHING MEDIA Use extinguishing media suitable for surrounding material.				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved positive pressure self-contained breathing apparatus when any material is involved in a fire.				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE Copper dust 1 mg/m ³ , fume 0.2 mg/m ³ , Aluminum 10 mg/m ³ (ACGIH 1985-86)	
SYMPTOMS OF OVER EXPOSURE Dust and fume - sneezing, congestion, metallic taste, nausea, chills, fever	
SKIN	EMERGENCY FIRST-AID PROCEDURES Dust or fume: Wash with soap and water before eating or smoking. If an irritation develops, call a physician.
EYES	Dust or fume: Flush with water for 15 minutes, call a physician.
INGESTION	Dust: Not a likely route of exposure. If ingested, call a physician.
INHALATION	Dust or fume: Remove victim to fresh air, call a physician.

Chemical

CAS No.

TRW-00804

SECTION VI - TOXICOLOGY (Product)

ACUTE ORAL LD 50	Copper 120 ug/kg (human)	CARCINOGENICITY	Not known to be carcinogenic
ACUTE ORAL TD _{LO}		MUTAGENICITY	Not known to be mutagenic
ACUTE DERMAL LD 50	No data for alloy	EYE IRRITATION	Dust is irritating
ACUTE INHALATION LC 50	No data for alloy	PRIMARY SKIN IRRITATION	Dust may be irritating
PRINCIPAL ROUTES OF ABSORPTION			
Inhalation of dust or fume			
EFFECTS OF ACUTE EXPOSURE			
Dust or fume: Skin, eye and mucous membrane irritation, metal fume fever, respiratory tract irritation.			
EFFECTS OF CHRONIC EXPOSURE			
None expected at industrial use levels. Chronic overexposure may cause liver and kidney effects.			

SECTION VII - SPILL AND LEAKAGE PROCEDURES (Control Procedures)

ACTION FOR MATERIAL RELEASE OR SPILL	
Dust or Fume: Wear NIOSH/MSHA approved high efficiency particulate respirator. Follow OSHA regulations for respirator use (See 29 CFR 1910.134). Wear goggles, coveralls, impervious gloves and boots. Shovel or sweep up and place in an appropriate container. Wash all contaminated clothing before reuse.	
In the event of a large spill, use the emergency telephone number shown on the front of this sheet.	
TRANSPORTATION EMERGENCY, CONTACT CHEMTREC 800-424-9300	
WASTE DISPOSAL METHOD	
Dispose of contaminated product and materials used in cleaning up spills or leaks in a manner approved for this material. Consult appropriate federal, state and local regulatory agencies to ascertain proper disposal procedures.	

SECTION VIII - SHIPPING DATA

D.O.T. CLASS	Not regulated
--------------	---------------

SECTION IX - REACTIVITY DATA

STABLE	<input checked="" type="checkbox"/> UNSTABLE	AT _____ °C _____ °F	HAZARDOUS POLYMERIZATION	MAY OCCUR
				WILL NOT OCCUR <input checked="" type="checkbox"/>
CONDITIONS TO AVOID		Presence of carbon monoxide during melting		
INCOMPATIBILITY (Material to Avoid)		dust and fume - acetylene, chlorine		
HAZARDOUS DECOMPOSITION PRODUCTS		copper fume, aluminum oxide		

SECTION X - PHYSICAL DATA

MELTING POINT	1830°F	VAPOR PRESSURE	N.A.	VOLATILES	N.A.
BOILING POINT	No data	SOLUBILITY IN WATER	Insoluble	EVAPORATION RATE	N.A.
SPECIFIC GRAVITY (H ₂ O = 1)	*	pH	N.A.	VAPOR DENSITY (Air = 1)	N.A.
*DENSITY	.299 lbs/in ³				

INFORMATION FURNISHED BY: Environmental Hygiene and Toxicology (203) 789-5436 DATE March 21, 1986 TRW-00805

Department of Environmental Hygiene and Toxicology (203) 789-5436

Olin CORPORATION
120 Long Ridge Road, Stamford, Connecticut 06904
OCEAN® Network
EMERGENCY PHONE 1-800-OLIN-011



Man-Gill Chemical

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EMERGENCY 24 HOUR CHEMTREC NO. 800-424-9300

JUN - 3 1992

MATERIAL SAFETY DATA SHEET

5292

Section I

Identity	Date Prepared 05/03/92	Date Revised 5/06/91
CORROSOL 52921	MFPA CODE:	
	HEALTH: 3	FLAMMABILITY: 0
		REACTIVITY: 1

Section II - Hazardous Ingredients

Hazardous Ingredients	SARA 313	CAS #	OSHA - PEL	ACGIH TLV	Other Hazard
SODIUM HYDROXIDE (CAUSTIC SODA LIQUID)	Not > 65 %	1310-73-2	2 MG/CUM (C) NIOSH - 2 MG/CUM/15M (C)	2 MG/CUM (C)	CORROSIVE

NO COMPONENT WAS FOUND TO BE CARCINOGENIC IN NTP, IARC OR OSHA

Section III - Physical/Chemical Characteristics

Boiling Point	NOT DETERMINED	Specific Gravity (H ₂ O=1)	1.21
Vapor Pressure (mm Hg)	NOT DETERMINED	Percent Volatile by Volume (%)	55
Vapor Density (AIR=Reference)	NOT DETERMINED	Evaporation Rate (ETHER=Reference)	LOWER
Water Soluble	YES		

Appearance and Odor
LIGHT STRAW-COLORED LIQUID

Section IV - Fire and Explosion Hazard Data

Flash Point (Method Used)	Flammable Limits	LEL	UEL
NOT FLAMMABLE	NOT APPLICABLE		
Extinguishing Media CARBON DIOXIDE, DRY CHEMICAL, FOAM, ALCOHOL FOAM			
Special Fire Fighting Procedures WEAR SELF CONTAINED BREATHING APPARATUS WITH FULL FACE PIECE AND PROTECTIVE CLOTHING WHILE FIGHTING FIRES			
Unusual Fire and Explosion Hazards NONE KNOWN.			

Section V - Reactivity Data

STABILITY	Unstable	Conditions to Avoid
	Stable	* NONE KNOWN

INCOMPATIBILITY (Materials to Avoid)
STRONG ACIDS

TRW-00806

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CORROSOL 52921

5292

Section V - Reactivity Data Cont.

Hazardous Decomposition Products
NONE KNOWN

HAZARDOUS May Occur Conditions to Avoid
POLYMERIZATION Will Not Occur * NONE

Section VI - Health Hazard Data

Primary Routes of Entry: Inhalation? * Skin? * Ingestion?

Effects of Overexposure MAY CAUSE MINOR TO MAJOR BURNS DEPENDING UPON DURATION OF EXPOSURE TO SKIN. MAY CAUSE SEVERE EYE IRRITATION AND BURNS. INHALATION OF MIST MAY CAUSE DAMAGE TO NASAL AND RESPIRATORY PASSAGES. INGESTION MAY RESULT IN SEVERE DAMAGE TO MUCOUS MEMBRANES AND DIGESTIVE TISSUE.

Medical Conditions Aggravated by Overexposure
NONE FOUND

Emergency and First Aid Procedures:

Eye (Contact): FLUSH EYES WITH COPIOUS AMOUNTS OF WATER FOR 15 MINUT AND CONTACT PHYSICIAN IMMEDIATELY.

Skin (Contact): FLUSH WITH WATER FOR 15 MINUTES. CONTACT PHYSICIAN IRRITATION PERSISTS.

Ingestion (Ingestion): DRINK LARGE QUANTITIES OF MILK OR WATER. CONSUL PHYSICIAN IMMEDIATELY.

Inhalation (Breathing): REMOVE TO FRESH AIR.

Section VII - Precautions for Safe Handling Use

Steps to be taken in Case Material is Released or Spilled

CONTAIN SPILL AND RECOVER CLEAN MATERIAL. NEUTRALIZE WITH DILUTE ACID.

Waste Disposal Method: DISPOSE IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS.

Precautions to be Taken for Handling and Storage STORE ABOVE FREEZING. KEEP CONTAINER TIGHTLY CLOSED WHEN NOT IN USE. STORE IN COOL, CLEAN, DRY LOCATION. STOCK SHOULD BE ROTATED.

Other Precautions SHOWERS AND EYE WASH FOUNTAINS SHOULD BE MADE AVAILABLE WHERE CHEMICALS ARE USED.

TRW-00807

Section VIII - Control Measures

Respiratory Protection (Specify Type)

USE NIOSH APPROVED EQUIPMENT WHEN AIRBORNE EXPOSURE LIMITS ARE EXCEEDED.

METAL PROCESSING SYSTEMS

0908-2173



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MATERIAL SAFETY DATA SHEET

CORROSOL 52921

5292

Section VIII - Control Measures Cont.

VENTILATION Local

Mechanical RECOMMENDED TO MAINTAIN BELOW TLV

Protective Gloves

NEOPRENE RUBBER

Eye Protection

SPLASH GOGGLES OR FACE

SHIELD

Other Protective Clothing or Equipment

PROTECTIVE CLOTHING SUFFICIENT TO PREVENT SKIN CONTACT.

Work/Hygienic Practices

WASH THOROUGHLY BEFORE EATING, SMOKING OR USING TOILET FACILITIES.

Section IX - Additional Information

D.O.T. Proper Shipping Name: ALKALINE LIQUID, N.O.S.

D.O.T. Hazard Class: CORROSIVE MATERIAL

D.O.T. Identification #: NA-1719

TRW-00808

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METAL PROCESSING SYSTEMS

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0908-2174



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MATERIAL SAFETY DATA SHEET

52921

Section I

Identity
CORROSOL 52921

Date Prepared 02/20/91

Date Revised 07/13/90

NFPA CODE:

HEALTH: 3

FLAMMABILITY: 0

REACTIVITY: 1

Section II - Hazardous Ingredients

Hazardous Ingredients	SARA 313	CAS #	OSHA - PEL	ACGIH TLV-TWA	Other Hazard
SODIUM HYDROXIDE (CAUSTIC SODA LIQUID)	Not > 50 %	1310-73-2	2 MG/CUM (C) NIOSH - 2 MG/CUM/15% (C)	2 MG/CUM (C)	CORROSIVE

NO COMPONENT WAS FOUND TO BE CARCINOGENIC IN NTP, IARC OR OSHA

Section III - Physical/Chemical Characteristics

Boiling Point

NOT DETERMINED

Specific Gravity (H2O=1)

1.45

Vapor Pressure (mm Hg)

NOT DETERMINED

Percent Volatile
by Volume (%)

55

Vapor Density (AIR=Reference)

NOT DETERMINED

Evaporation Rate
(ETHER=Reference)

SLOWER

Water Soluble

YES

Appearance and Odor

LIGHT STRAW-COLORED LIQUID

Section IV - Fire and Explosion Hazard Data

Flash Point (Method Used)

NOT FLAMMABLE

Flammable Limits

NOT APPLICABLE

LEL

UEL

Extinguishing Media CARBON DIOXIDE, DRY CHEMICAL, FOAM, ALCOHOL FOAM.

Special Fire Fighting Procedures WEAR SELF CONTAINED BREATHING
APPARATUS WITH FULL FACE PIECE AND PROTECTIVE CLOTHING WHILE FIGHTING FIRES

Unusual Fire and Explosion Hazards NONE KNOWN.

Section V - Reactivity Data

STABILITY

Unstable

Conditions to Avoid

Stable

* NONE KNOWN

INCOMPATIBILITY (Materials to Avoid)

STRONG ACIDS

TRW-00809

0908-2175

METAL PROCESSING SYSTEMS

MAN-GILL CHEMICAL COMPANY

Page 1 Continued

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CORROSOL 52921

52921

Section V - Reactivity Data Cont.

Hazardous Decomposition Products

NONE KNOWN

HAZARDOUS

May Occur Conditions to Avoid

POLYMERIZATION

Will Not Occur * NONE

Section VI - Health Hazard Data

Primary Routes of Entry: Inhalation? * Skin? * Ingestion?

Effects of Overexposure MAY CAUSE MINOR TO MAJOR BURNS DEPENDING UPON DURATION OF EXPOSURE TO SKIN. MAY CAUSE SEVERE EYE IRRITATION AND BURNS. INHALATION OF MIST MAY CAUSE DAMAGE TO NASAL AND RESPIRATORY PASSAGES. INGESTION MAY RESULT IN SEVERE DAMAGE TO MUCCOUS MEMBRANES AND DEEP TISSUE.

Medical Conditions Aggravated by Overexposure

NONE FOUND

Emergency and First Aid Procedures:

Eye (Contact): FLUSH EYES WITH COPIOUS AMOUNTS OF WATER FOR 15 MINUTES AND CONTACT PHYSICIAN IMMEDIATELY.

Skin (Contact): FLUSH WITH WATER FOR 15 MINUTES. CONTACT PHYSICIAN IF IRRITATION PERSISTS.

Ingestion (Ingestion): DRINK LARGE QUANTITIES OF MILK OR WATER. CONSULT PHYSICIAN IMMEDIATELY.

Inhalation (Breathing): REMOVE TO FRESH AIR.

Section VII - Precautions for Safe Handling & Use

Steps to be taken in Case Material is Released or Spilled

CONTAIN SPILL AND RECOVER CLEAN MATERIAL. NEUTRALIZE WITH DILUTE ACID.

Waste Disposal Method: DISPOSE IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS.

Precautions to be Taken for Handling and Storage STORE ABOVE FREEZING.

KEEP CONTAINER TIGHTLY CLOSED WHEN NOT IN USE. STORE IN COOL, CLEAN, DRY LOCATION. STOCK SHOULD BE ROTATED.

Other Precautions SHOWERS AND EYE WASH FOUNTAINS SHOULD BE MADE AVAILABLE WHERE CHEMICALS ARE USED.

TRW-00810

Section VIII - Control Measures

Respiratory Protection (Specify Type)

USE NIOSH APPROVED EQUIPMENT WHEN AIRBORNE EXPOSURE LIMITS ARE EXCEEDED.

METAL PROCESSING SYSTEMS

2 Continues

**Man-Gill CHEMICAL**

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EMERGENCY 24 HOUR CHEMTREC NO. 800-424-9300

MATERIAL SAFETY DATA SHEET

CORROSOL 52921

52921

Section VIII - Control Measures Cont.**VENTILATION** Local

Mechanical RECOMMENDED TO MAINTAIN BELOW TLV

Protective Gloves

NEOPRENE RUBBER

Eye Protection

SPASH GOGGLES OR FACE SHIELD

Other Protective Clothing or Equipment

PROTECTIVE CLOTHING SUFFICIENT TO PREVENT SKIN CONTACT.

Work/Hygienic Practices

WASH THOROUGHLY BEFORE EATING, SMOKING OR USING TOILET FACILITIES.

Section IX - Additional Information**D.O.T. Proper Shipping Name:** CAUSTIC ALKALI LIQUIDS, N.O.S.
(SODIUM HYDROXIDE)**D.O.T. Hazard Class:** CORROSIVE MATERIAL**D.O.T. Identification #:** UN-1719

TRW-00811

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METAL PROCESSING SYSTEMS

CREAM OF TARTAR FCC POWD

REVISION ~~OF-04-19-89~~Received
JUN - 5 1992

MAIL TO:

24026847
FREDERICK GUMM CHEM CO
20 INDUSTRIAL DRIVEORDER NO: 240501546
PROD NO: 04102454

SMITHFIELD

RI 02917

VAN WATERS & ROGERS INC. 1600 NORTON BLDG. SEATTLE, WA 98104-1564

-----EMERGENCY ASSISTANCE-----

FOR EMERGENCY ASSISTANCE INVOLVING CHEMICALS CALL CHEMTREC
(800) 424-9300.

-----FOR PRODUCT AND SALES INFORMATION-----

CONTACT YOUR LOCAL VAN WATERS & ROGERS BRANCH OFFICE

-----PRODUCT IDENTIFICATION-----

PRODUCT NAME: CREAM OF TARTAR
COMMON NAMES/SYNONYM: POTASSIUM
TARTRATECAS NO.: 868-14-4
VW&R CODE: P1147FORMULA: KHC4H4O6
HAZARD RATING (NFPA 704 CRITERIA)
HEALTH: 0
FIRE: 0
REACTIVITY: 0
SPECIAL: NONEDATE ISSUED: 10/87
SUPERCEDES:
HAZARD RATING SCALE:
0=MINIMAL 3=SERIOUS
1=SLIGHT 4=SEVERE
2=MODERATE

-----HAZARDOUS INGREDIENTS-----

COMPONENTS	CAS NO.	%	PEL	EXPOSURE LIMITS, PPM			HAZARD
				OSHA	ACGIH	OTHER	
				TLV	TLV	LIMIT	
POTASSIUM TARTRATE	868-14-4	>99	NONE	NONE	NONE	NONE	NONE

-----PHYSICAL PROPERTIES-----

BOILING POINT, DEG F: NOT APPLICABLE VAPOR PRESSURE, MM HG/20 DEG C: NOT APPLICABLE
MELTING POINT, DEG F: NOT APPLICABLE VAPOR DENSITY (AIR=1): NOT APPLICABLE
SPECIFIC GRAVITY (WATER=1): 1.956 WATER SOLUBILITY, %: 1G/165 ML
APPEARANCE AND ODOR: EVAPORATION RATE (BUTYL ACETATE=1): NOT APPLICABLE
ODORLESS WHITE CRYSTALS OR POWDER, PLEASANT ACID TASTE. APPLICABLE

-----FIRST AID MEASURES-----

IF INHALED: REMOVE TO FRESH AIR. GIVE ARTIFICIAL RESPIRATION IF NOT BREATHING. GET IMMEDIATE MEDICAL ATTENTION.

IN CASE OF EYE CONTACT: IMMEDIATELY FLUSH EYES WITH LOTS OF RUNNING WATER FOR 15 MINUTES, LIFTING THE UPPER AND LOWER EYELIDS OCCASIONALLY. GET IMMEDIATE MEDICAL ATTENTION.

IN CASE OF SKIN CONTACT: IMMEDIATELY WASH SKIN WITH LOTS OF SOAP AND

PROD: 04102454 03:15:33 14 JUL 1989 CUST: 24026847 INVOICE: 240501546

AUG 8 9 REC'D

CREAM OF TARTAR FCC POWD

REVISION OF: 04-19-89

WATER. REMOVE CONTAMINATED CLOTHING AND SHOES; WASH BEFORE REUSE. GET MEDICAL ATTENTION IF IRRITATION PERSISTS AFTER WASHING.

IF SWALLOWED: IF CONSCIOUS, IMMEDIATELY INDUCE VOMITING BY GIVING 2 GLASSES OF WATER AND STICKING A FINGER DOWN THE THROAT. GET IMMEDIATE MEDICAL ATTENTION. DO NOT GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS OR CONVULSING PERSON.

-----HEALTH HAZARD INFORMATION-----

PRIMARY ROUTES OF EXPOSURE: INHALATION, SKIN OR EYE CONTACT.

SIGNS AND SYMPTOMS OF EXPOSURE

INHALATION: NONE CURRENTLY KNOWN.

EYE CONTACT: NONE CURRENTLY KNOWN.

SKIN CONTACT: NONE CURRENTLY KNOWN.

SWALLOWED: NONE CURRENTLY KNOWN.

CHRONIC EFFECTS OF EXPOSURE: NO SPECIFIC INFORMATION AVAILABLE.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: NONE REPORTED.

-----TOXICITY DATA-----

ORAL: NO DATA FOUND

DERMAL: NO DATA FOUND

INHALATION: NO DATA FOUND

CARCINOGENICITY: THIS MATERIAL IS NOT CONSIDERED TO BE A CARCINOGEN BY THE NATIONAL TOXICOLOGY PROGRAM, THE INTERNATIONAL AGENCY FOR RESEARCH ON CANCER, OR THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

OTHER DATA: NONE

-----PERSONAL PROTECTION-----

VENTILATION: LOCAL MECHANICAL EXHAUST VENTILATION CAPABLE OF MINIMIZING DUST EMISSIONS AT THE POINT OF USE.

RESPIRATORY PROTECTION: IF USE CONDITIONS GENERATE DUSTS, WEAR A NIOSH-APPROVED RESPIRATOR APPROPRIATE FOR THOSE EMISSION LEVELS. APPROPRIATE RESPIRATORS MAY BE A FULL FACEPIECE OR A HALF MASK AIR-PURIFYING CART-RIDGE RESPIRATOR WITH PARTICULATE FILTERS, A SELF-CONTAINED BREATHING APPARATUS IN THE PRESSURE DEMAND MODE, OR A SUPPLIED-AIR RESPIRATOR.

EYE PROTECTION: CHEMICAL GOGGLES AND FULL FACESHIELD UNLESS A FULL FACEPIECE RESPIRATOR IS ALSO WORN. IT IS GENERALLY RECOGNIZED THAT CONTACT LENSES SHOULD NOT BE WORN WHEN WORKING WITH CHEMICALS BECAUSE CONTACT LENSES MAY CONTRIBUTE TO THE SEVERITY OF AN EYE INJURY.

PROTECTIVE CLOTHING: LONG-SLEEVED SHIRT, TROUSERS, RUBBER BOOTS, RUBBER BOOTS, RUBBER GLOVES AND RUBBER APRON.

OTHER PROTECTIVE MEASURES: AN EYEWASH AND SAFETY SHOWER SHOULD BE NEARBY AND READY FOR USE.

-----FIRE AND EXPLOSION INFORMATION-----

FLASH POINT, DEG F: NO DATA FOUND

METHOD USED: NO DATA FOUND

FLAMMABLE LIMITS IN AIR, %

LOWER: NO DATA FOUND

UPPER: NO DATA FOUND

EXTINGUISHING MEDIA: USE WATER SPRAY, DRY CHEMICAL, CO2, OR ALCOHOL FOAM.

SPECIAL FIRE FIGHTING PROCEDURES: FIRE FIGHTERS SHOULD WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. USE WATER

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SPRAY TO COOL NEARBY CONTAINERS AND STRUCTURES EXPOSED TO FIRE.

UNUSUAL FIRE AND EXPLOSION HAZARDS: NONE.

-----HAZARDOUS REACTIVITY-----

STABILITY: STABLE

POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: NONE

MATERIALS TO AVOID: ALKALI

HAZARDOUS DECOMPOSITION PRODUCTS: MAY LIBERATE CARBON MONOXIDE AND CARBON DIOXIDE AND OXIDES OF POTASSIUM.

-----SPILL, LEAK, AND DISPOSAL PROCEDURES-----

ACTION TO TAKE FOR SPILLS OR LEAKS: WEAR PROTECTIVE EQUIPMENT INCLUDING RUBBER BOOTS, RUBBER GLOVES, RUBBER APRON, AND A FULL FACEPIECE OR A HALF MASK AIR-PURIFYING CARTRIDGE RESPIRATOR WITH PARTICULATE FILTERS. WEAR CHEMICAL GOGGLES IF A HALF MASK IS WORN. FOR SMALL SPILLS, SWEEP UP AND DISPOSE OF IN DOT-APPROVED WASTE CONTAINERS. FOR LARGE SPILLS, SHOVEL INTO DOT-APPROVED WASTE CONTAINERS. KEEP OUT OF SEWERS, STORM DRAINS, SURFACE WATERS, AND SOIL. COMPLY WITH ALL APPLICABLE GOVERNMENTAL REGULATIONS ON SPILL REPORTING, AND HANDLING AND DISPOSAL OF WASTE.

DISPOSAL METHODS: DISPOSE OF CONTAMINATED PRODUCT AND MATERIALS USED IN CLEANING UP SPILLS OR LEAKS IN A MANNER APPROVED FOR THIS MATERIAL. CONSULT APPROPRIATE FEDERAL, STATE AND LOCAL REGULATORY AGENCIES TO ASCERTAIN PROPER DISPOSAL PROCEDURES.

NOTE: EMPTY CONTAINERS CAN HAVE RESIDUES, GASES AND MISTS AND ARE SUBJECT TO PROPER WASTE DISPOSAL, AS ABOVE.

-----SPECIAL PRECAUTIONS-----

STORAGE AND HANDLING PRECAUTIONS: STORE IN A DRY, WELL-VENTILATED PLACE AWAY FROM INCOMPATIBLE MATERIALS. KEEP CONTAINER TIGHTLY CLOSED WHEN NOT IN USE. DO NOT USE PRESSURE TO EMPTY CONTAINER. WASH THOROUGHLY AFTER HANDLING. DO NOT GET IN EYES, ON SKIN, OR ON CLOTHING.

REPAIR AND MAINTENANCE PRECAUTIONS: NONE.

ACTION TO TAKE FOR SPILLS OR LEAKS: WEAR PROTECTIVE EQUIPMENT INCLUDING RUBBER BOOTS, RUBBER GLOVES, RUBBER APRON, AND A FULL FACEPIECE OR A HALF MASK AIR-PURIFYING CARTRIDGE RESPIRATOR WITH PARTICULATE FILTERS. WEAR CHEMICAL GOGGLES IF A HALF MASK IS WORN. FOR SMALL SPILLS, SWEEP UP AND DISPOSE OF IN DOT-APPROVED WASTE CONTAINERS. FOR LARGE SPILLS, SHOVEL INTO DOT-APPROVED WASTE CONTAINERS. KEEP OUT OF SEWERS, STORM DRAINS, SURFACE WATERS, AND SOIL. COMPLY WITH ALL APPLICABLE GOVERNMENTAL REGULATIONS ON SPILL REPORTING, AND HANDLING AND DISPOSAL OF WASTE.

OTHER PRECAUTIONS: CONTAINERS, EVEN THOSE THAT HAVE BEEN EXPTIED, WILL RETAIN PRODUCT RESIDUE AND VAPORS. ALWAYS OBEY HAZARD WARNINGS AND HANDLE EMPTY CONTAINERS AS IF THEY WERE FULL. THIS PRODUCT IS INTENDED FOR USE IN FOOD, ANIMAL FEED, DRUG, OR COSMETIC MANUFACTURE AND IT HAS BEEN PRODUCED AND PACKAGED IN ACCORDANCE WITH STRICT QUALITY PRACTICES. MAINTAIN THIS QUALITY LEVEL BY STORING THIS PRODUCT AWAY FROM OTHER CHEMICALS, HANDLING IT WITH CARE, AND AVOIDING ALL SOURCES OF CONTAMINATION. HANDLING IT WITH CARE, AND AVOIDING ALL SOURCES OF CONTAMINATION.

-----FOR ADDITIONAL INFORMATION-----

CONTACT DOUGLAS EISNER, TECHNICAL DIRECTOR, VAN WATERS & ROGERS INC.
DURING BUSINESS HOURS, PACIFIC TIME (206)447-5911

-----NOTICE-----

VAN WATERS & ROGERS INC. ("VW&R") EXPRESSLY DISCLAIMS ALL EXPRESS

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CREAM OF TARTAR FCC POWD

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OR IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WITH RESPECT TO THE PRODUCT OR INFORMATION PROVIDED HEREIN. **

ALL INFORMATION APPEARING HEREIN IS BASED UPON DATA OBTAINED FROM THE MANUFACTURER AND/OR RECOGNIZED TECHNICAL SOURCES. WHILE THE INFORMATION IS BELIEVED TO BE ACCURATE, VW&R MAKES NO REPRESENTATIONS AS TO ITS ACCURACY OR SUFFICIENCY. CONDITIONS OF USE ARE BEYOND VW&R'S CONTROL AND THEREFORE USERS ARE RESPONSIBLE TO VERIFY THIS DATA UNDER THEIR OWN OPERATING CONDITIONS TO DETERMINE WHETHER THE PRODUCT IS SUITABLE FOR THEIR PARTICULAR PURPOSES AND THEY ASSUME ALL RISKS OF THEIR USE, HANDLING, AND DISPOSAL OF THE PRODUCT, OR FROM THE PUBLICATION OR USE OF, OR RELIANCE UPON, INFORMATION CONTAINED HEREIN. THIS INFORMATION RELATES ONLY TO THE PRODUCT DESIGNATED HEREIN, AND DOES NOT RELATE TO ITS USE IN COMBINATION WITH ANY OTHER MATERIAL OR IN ANY OTHER PROCESS.

**** E N D O F M S D S ****

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TRW-00815

0908-2181



ENTHONE-OMI
(NORTH AMERICA), INC.

MATERIAL SAFETY DATA SHEET

ENTEK® CU-58

P.O. BOX 1900
NEW HAVEN, CT 06508

EMERGENCY PHONE NUMBERS

PLANTS 203-934-8611 (8:30am-5pm EST)
312-598-3210 (8:30am-5pm CST)
MFSA 313-644-5626 (24 hours)
CHEMTREC 800-424-9300 (Transportation)

PRODUCT CODE#: 2806
DATE ISSUED: 2/9/89
SUPERCEDES: 4/30/87
PREPARER: F.R. Hirtler
FRH

II. HAZARDOUS INGREDIENTS

COMPONENT	COMMON NAME	CAS NO.	OSHA-PEL	ACGIH-TLV	%
Methanol	Methyl alcohol	67-56-1	260 mg/m3	260 mg/m3	>40
Benzotriazole		95-14-7	NI*	NI*	<5
Sodium m-Nitrobenzenesulfonate		127-68-4	NI	NI	<5
Water		7732-18-5	NI	NI	>45

*Recommended: PEL: 15 mg/m3; TLV: 10 mg/m3

III. PHYSICAL PROPERTIES

SPECIFIC GRAVITY (WATER =1)	0.950	BOILING POINT, °F	172
EVAP. RATE (BUTYL ACETATE=1)	NI	MELTING POINT, °F	20
VAPOR PRESSURE, mmHg	55	SOLUBILITY IN WATER	complete
VAPOR DENSITY (AIR=1)	NI	APPEARANCE	light yellow liquid
pH (AS IS)	7.4	ODOR	alcoholic

IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT, °F	100 (O.C.); 80 (C.C.)	FLAMMABLE LIMITS (AIR)	NI	LEL	NI	UEL
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EXTINGUISHING MEDIA

☐ Not Combustible ☒ Water fog or spray ☒ Carbon Dioxide ☒ Dry Chemical ☒ Alcohol Foam ☐ Foam ☐ Sand or Earth

SPECIAL FIRE FIGHTING PROCEDURES

Wear NIOSH approved full protective clothing and self-contained breathing apparatus. Keep containers cool to prevent rupture and release of material.

UNUSUAL FIRE AND EXPLOSION HAZARDS

At high temperatures may release toxic oxides of nitrogen and sulfur.

V. HEALTH HAZARD DATA**EFFECTS OF ACUTE EXPOSURE:**

INHALATION: Dizziness, drowsiness, disturbance of vision.

INGESTION: May be fatal and can cause blindness.

SKIN: Can cause irritation.

EYES: Can cause severe irritation, damage to eyes.

EFFECTS OF CHRONIC EXPOSURE:

Prolonged exposure may lead to impairment of vision.

CARCINOGEN: Not listed by NTP, IARC, OSHA

REFERENCE:**EMERGENCY AND FIRST AID PROCEDURES**

INHALATION: Remove person from contaminated area. If breathing has stopped, resuscitate and administer oxygen if available.
Seek immediate medical attention.

INGESTION: Never give anything by mouth to an unconscious person, obtain immediate medical attention. If vomiting occurs spontaneously, keep airway clear. If swallowed give large amounts of water and INDUCE VOMITING.
Seek immediate medical attention.

SKIN: Immediately wash contaminated skin with plenty of water for 15 minutes. Remove contaminated clothing and footwear. Wash clothing before reuse. Discard footwear if it cannot be decontaminated.
Seek immediate medical attention.

EYES: Immediately flush eyes with plenty of water for at least 15 minutes holding lids apart to ensure flushing of entire surface. Washing eyes within several seconds of exposure is essential to minimize damage.
Seek immediate medical attention.

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VI. PRECAUTIONS FOR SAFE HANDLING AND USE**PILL PROCEDURES:**

Protect area from sources of ignition. Do not breath mist or vapors. Wear protective equipment. Contain spill and soak up with suitable material such as sand, earth, then transfer to clean steel drum and cover. Dispose of in accordance with Local, State and Federal regulations.

STORAGE AND HANDLING PRECAUTIONS:

Store in cool dry place; avoid heat, sparks and open flame.

ADDITIONAL INFORMATION:

Use explosion proof electrical equipment.

VII. CONTROL MEASURES

VENTILATION: Local exhaust recommended.

RESPIRATOR: Use NIOSH approved respirator when air concentration is greater than the TLV or PEL.
Use cartridge filter for organic vapors.

EYE PROTECTION: ☐ Safety glasses ☒ Chemical safety goggles ☒ Face shield

PROTECTIVE GLOVES: ☒ Neoprene ☒ Natural rubber Other:

OTHER PROTECTIVE CLOTHING OR EQUIPMENT:

Chemically resistant coveralls, hat, and shoes or boots.

WORK/HYGENIC PRACTICES:

Emergency eye wash and safety shower should be available. Wash thoroughly after handling.

ADDITIONAL INFORMATION:

For waste disposal of operating solutions consult Enthone Waste Disposal Procedures. For major spills consult Enthone for disposal assistance. Dispose of in accordance with Local, State, and Federal regulations.

CAS = Chemical Abstract Service

NI = No relevant information available

NA = Not applicable

Trade Secret = Claimed as allowed under 29 CFR 1910.1200

PEL = OSHA Permissible Exposure Limit

TLV = ACGIH Threshold Limit Value

NTP = National Toxicology Program

IARC = Int'l Agency for Research on Cancer

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VIII. REACTIVITY DATA

X	Stable	CONDITIONS TO AVOID: Stable under normal conditions. See Incompatibility information.	
	Unstable		
INCOMPATIBILITY (Materials to avoid): Alkali metals, concentrated nitric and sulfuric acids, acyl chlorides.			
HAZARDOUS DECOMPOSITION PRODUCTS: Toxic carbon monoxide, carbon dioxide, oxides of nitrogen and sulfur, also nitroaromatics.			
HAZARDOUS		May occur	CONDITIONS TO AVOID: NA
POLYMERIZATION	X	Will not occur	

IX. ADDITIONAL INFORMATION

This product contains one or more chemicals which are subject to the reporting requirements of SARA, TITLE III, Section 313 (40 CFR 372). The chemical(s) are listed in Section II, HAZARDOUS INGREDIENTS, along with the CAS (Chemical Abstract Service) # and the ingredient concentration which will be within 5% of the figure stated. This notice must be included in any subsequent copying of this MSDS.

This Material Safety Data Sheet may be used to comply with OSHA's Hazard Communication Standard, 29 CFR 1910.1200. Enthone, Inc. furnishes the data contained herein in good faith at customer's request without liability or legal responsibility for same whatsoever, and no warranty or guarantee, express or implied, is made with respect to such data; nor does Enthone, Inc. grant permission, recommendation, or inducement to infringe any patent whether owned by Enthone or others. The data is offered solely for your information and consideration. Since conditions of use are beyond Enthone's control, user assumes all responsibility and risk.

TRW-00819

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12-25-88

Process Lab
DEPT 731

FFFFFFFF III SSSSS HH HH EEEEE RRRR
FFFFFFFF III SS SS HH HH EEEEE RR RR
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MM MM SSSSS DDDDD SSSSS
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MM MM SS DD DD SS
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IMPORTANT SAFETY INFORMATION -- DO NOT DISCARD.
PLEASE ROUTE TO COMPANY SAFETY OFFICER.

FISHER SCIENTIFIC HAS A
COMPLETE LINE OF SAFETY
PRODUCTS AND INFORMATION
FOR THE LABORATORY.
CONTACT YOUR LOCAL FISHER
BRANCH FOR FILMS, BRO-
CHURES, CATALOGS AND PRO-
DUCTS.

ELLIE GOVENNELLA
PURCHASING AGENT
TRW FASTENERS DIV
31 AMES STREET
CAMBRIDGE MA 02142

IF NAME AND/OR ADDRESS HAVE CHANGED, CONTACT YOUR
FISHER SALES REPRESENTATIVE OR LOCAL FISHER BRANCH.

FOR EACH CHEMICAL, AN MSDS SHEET WILL BE SENT ONLY
ON THE 1ST SHIPMENT UNLESS A SUBSTANTIAL REVISION
OCCURS.

REQUIRED MATERIAL SAFETY DATA SHEETS (MSDS) NOT
INCLUDED IN THIS MAILING WILL FOLLOW UNDER SEP-
ARATE COVER.

THIS PACKET MAY CONTAIN MSDS FOR PRODUCTS MAN-
UFACTURED BY OTHERS AND DISTRIBUTED BY FISHER
SCIENTIFIC COMPANY. THESE MSDS WERE PREPARED
BY THE MANUFACTURER AND FISHER DISCLAIMS ALL
LIABILITY FOR THE CONTENT.

* >>>> NEW FORMAT <<<< *
* >>>> NEW FORMAT <<<< *
* >>>> NEW FORMAT <<<< *
* >>>> NEW FORMAT <<<< *

* ATTENTION: *
* IN RESPONSE TO FISHER CUSTOMER REQUESTS! *
* * EASIER TO READ *
* * BINDER COMPATIBLE *
* * LATEST REVISION (DISCARD OLD MSDS) *
* * CONTAINS LATEST REGULATORY INFORMATION *
* PROPOSITION 65 *
* SARA SECTION 313 TITLE III *

TRW-00820

***CUPRIC CHLORIDE**
 ***CUPRIC CHLORIDE**
 ***CUPRIC CHLORIDE**

MATERIAL SAFETY DATA SHEET

FISHER SCIENTIFIC
 CHEMICAL DIVISION
 1 REAGENT LANE
 FAIR LAWN NJ 07410
 (201) 796-7100

EMERGENCY CONTACTS:
 GASTON L. PILLORI; (201) 796-7100
 AFTER BUSINESS HOURS; HOLIDAYS:
 (201) 796-7523
 CHEMTREC ASSISTANCE: (800) 429-9300

DATE: 04/30/89
 PO NBR: C4421
 ACCT: 819249-02
 INDEX: 04891110013
 CAT NO: C4543

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SUBSTANCE IDENTIFICATION

CAS-NUMBER 7447-39-4

SUBSTANCE: ***CUPRIC CHLORIDE**

TRADE NAMES/SYNONYMS:
 COPPER(II) CHLORIDE, CUPRIC DICHLORIDE, COPPER CHLORIDE (CUCL2);
 COPPER CHLORIDE, COPPER BICHLORIDE, COPPER DICHLORIDE, COPPER(2+) CHLORIDE,
 STCC 4944173, UN 2802, C-454, C-455, CL2CU, ACC05620

CHEMICAL FAMILY:
 INORGANIC SALT

MOLECULAR FORMULA: CU-CL2

MOLECULAR WEIGHT: 134.45

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=0 REACTIVITY=0 PERSISTENCE=3
 NFPA RATINGS (SCALE 0-4): HEALTH=U FIRE=0 REACTIVITY=0

COMPONENTS AND CONTAMINANTS

COMPONENT: CUPRIC CHLORIDE

PERCENT: 100.0

OTHER CONTAMINANTS: NONE

EXPOSURE LIMITS:
 COPPER DUST AND MIST (AS CU):
 1 MG/M3 OSHA TWA
 1 MG/M3 ACGIH TWA

SUBJECT TO SARA SECTION 313 ANNUAL TOXIC CHEMICAL RELEASE REPORTING

CUPRIC CHLORIDE:
 10 POUNDS CERCLA SECTION 103 REPORTABLE QUANTITY

PHYSICAL DATA

DESCRIPTION: BROWNISH-YELLOW HYGROSCOPIC MICROCRYSTALLINE POWDER.

BOILING POINT: 1819 F (993 C) (DECOMPOSES) MELTING POINT: 1148 F (620 C)

SPECIFIC GRAVITY: 3.386 @ 25 C SOLUBILITY IN WATER: 70.6% @ 0 F

SOLVENT SOLUBILITY: SOLUBLE IN ETHANOL, METHANOL, ACETONE,
 HOT SULFURIC ACID.

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
 NEGLIGIBLE FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.

FIREFIGHTING MEDIA:
 DRY CHEMICAL, CARBON DIOXIDE, HALON, WATER SPRAY OR STANDARD FOAM
 (1987 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.4).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR STANDARD FOAM
 (1987 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.4).

FIREFIGHTING:
 MOVE CONTAINERS FROM FIRE AREA IF POSSIBLE. COOL CONTAINERS EXPOSED TO FLAMES
 WITH WATER FROM SIDE UNTIL WELL AFTER FIRE IS OUT. STAY AWAY FROM STORAGE TANK
 ENDS (1987 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.4, GUIDE PAGE 60).

USE AGENTS SUITABLE FOR TYPE OF FIRE. AVOID BREATHING CORROSIVE VAPORS, KEEP
 UPWIND.

TRANSPORTATION DATA

DEPARTMENT OF TRANSPORTATION HAZARD CLASSIFICATION 49CFR172.101:
 ORM-B

TRW-00821

DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS 49CFR172.101 AND 172.402:
NONE

DEPARTMENT OF TRANSPORTATION PACKAGING REQUIREMENTS: 49CFR173.800
EXCEPTIONS: 49CFR173.505

TOXICITY

CUPRIC CHLORIDE:

TOXICITY DATA:

ANHYDROUS: 200 MG/KG ORAL-HUMAN LDLO; 140 MG/KG ORAL-RAT LD50; 190
MG/KG ORAL-MOUSE LD50; 31 MG/KG ORAL-GUINEA PIG LD50; 7400 UG/KG
INTRAPERITONEAL-MOUSE LD50; 100 MG/KG SUBCUTANEOUS-GUINEA PIG LDLO;
17,500 UG/KG INTRAVENOUS-MOUSE LD50; MUTAGENIC DATA (RTECS); REPRODUCTIVE
EFFECTS DATA (RTECS).

DIHYDRATE: NO DATA AVAILABLE.

CARCINOGEN STATUS: NONE.

LOCAL EFFECTS: IRRITANT- EYE, SKIN, AND MUCOUS MEMBRANES.

ACUTE TOXICITY EFFECTS: TOXIC BY INGESTION.

TARGET EFFECTS: POISONING MAY AFFECT THE LIVER, KIDNEYS AND SPLEEN.
AT INCREASED RISK FROM EXPOSURE (TO COPPER SALTS); PERSONS WITH PRE-EXISTING
RESPIRATORY, LIVER, SKIN, KIDNEY, HEMATOPOETIC OR WILSON'S DISEASE.

HEALTH EFFECTS AND FIRST AID

INHALATION:

CUPRIC CHLORIDE:

IRRITANT.

ACUTE EXPOSURE- MAY CAUSE IRRITATION OF MUCOUS MEMBRANES, SORE THROAT,
COUGHING, AND SHORTNESS OF BREATH. INHALATION OF COPPER DUST MAY CAUSE
AN ILLNESS SIMILAR TO THE COMMON COLD WITH SENSATIONS OF CHILLS AND
STUFFINESS OF THE HEAD.

CHRONIC EXPOSURE- PROLONGED INHALATION OF DUST OR MIST OF COPPER SALTS MAY
CAUSE CONGESTION OF THE NASAL MUCOUS MEMBRANES, SOMETIMES OF THE PHARYNX,
AND ON OCCASIONS ULCERATION AND PERFORATION OF THE NASAL SEPTUM. ATROPHIC
CHANGES IN THE MUCOUS MEMBRANES WERE NOTED IN SUBJECTS EXPOSED TO COMPLEX
COPPER SALTS FOR LONG PERIODS OF TIME. INHALATION OF COPPER COMPOUNDS HAS
CAUSED INJURY TO THE LUNGS AND LIVER WITH HEMOCHROMATOSIS IN ANIMALS.
REPRODUCTIVE EFFECTS HAVE BEEN REPORTED IN ANIMALS.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING
HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP PERSON WARM AND AT REST.
TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:

CUPRIC CHLORIDE:

IRRITANT.

ACUTE EXPOSURE- DIRECT CONTACT MAY CAUSE REDNESS, PAIN, AND IRRITATION.
COPPER SALTS HAVE BEEN REPORTED TO CAUSE AN ITCHING PAPULOVESICULATION,
SKIN DISCOLORATION AND ECZEMATOID LESIONS.

CHRONIC EXPOSURE- REPEATED OR PROLONGED CONTACT WITH SOME COPPER SALTS HAS
RESULTED IN IRRITATION, NECROSIS, AND GREENISH SKIN DISCOLORATION.
ALLERGIC CONTACT DERMATITIS, ALTHOUGH RARE, HAS BEEN REPORTED.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED
AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO
EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL
ATTENTION IMMEDIATELY.

EYE CONTACT:

CUPRIC CHLORIDE:

IRRITANT.

ACUTE EXPOSURE- DIRECT CONTACT MAY CAUSE REDNESS, PAIN, AND BLURRED VISION.
APPLICATION OF A 0.08 TO 0.16 M SOLUTION OF CUPRIC CHLORIDE TO THE
CORNEAS OF RABBITS AFTER THE REMOVAL OF THE EPITHELIUM CAUSED A
SEVERE REACTION WITH PERMANENT OPACIFICATION. SOME COPPER SALTS
HAVE BEEN REPORTED TO CAUSE CONJUNCTIVITIS, CORNEAL ULCERATION, AND
TURBIDITY POSSIBLY WITH PALPEBRAL EDEMA. COPPER PARTICLES EMBEDDED IN
THE EYE MAY RESULT IN A PRONOUNCED FOREIGN-BODY RESPONSE WITH
CHARACTERISTIC DISCOLORATION OF OCULAR TISSUE.

CHRONIC EXPOSURE- REPEATED AND PROLONGED CONTACT WITH IRRITANTS MAY CAUSE
CONJUNCTIVITIS.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER OR NORMAL SALINE.
OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL
REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:

CUPRIC CHLORIDE:

TOXIC.

ACUTE EXPOSURE- THE MEDIAN LETHAL DOSE IN RATS WAS 140 MG/KG. INGESTION
MAY CAUSE ABDOMINAL PAIN, VOMITING AND DIARRHEA. INGESTION OF COPPER
SALTS MAY CAUSE AN IMMEDIATE METALLIC TASTE, SALIVATION, NAUSEA,
EPIGASTRIC BURNING, ULCERS, HEMORRHAGIC GASTRITIS, ANURIA, COMA,
CONVULSIONS AND DEATH.

CHRONIC EXPOSURE- REPEATED AND PROLONGED INGESTION OF COPPER SALTS HAS
PRODUCED HEMOLYTIC ANEMIA AND LIVER, KIDNEY, AND SPLEEN DAMAGE IN ANIMALS.

FIRST AID- IF VICTIM IS CONSCIOUS, IMMEDIATELY GIVE 2 TO 4 GLASSES OF WATER,
AND INDUCE VOMITING BY TOUCHING FINGER TO BACK OF THROAT. GET MEDICAL
ATTENTION IMMEDIATELY.

ANTIDOTE:

THE FOLLOWING ANTIDOTE(S) HAVE BEEN RECOMMENDED. HOWEVER, THE DECISION AS TO

*****CUPRIC CHLORIDE***** PAGE 03 OF 04
WHETHER THE SEVERITY OF POISONING REQUIRES ADMINISTRATION OF ANY ANTIDOTE AND
ACTUAL DOSE REQUIRED SHOULD BE MADE BY QUALIFIED MEDICAL PERSONNEL.

COPPER POISONING:
GIVE CALCIUM DISODIUM EDETATE 15-25 MG/KG (0.08-0.125 ML OF 20% SOLUTION PER
KILOGRAM BODY WEIGHT) IN 250-500 ML OF 5% DEXTROSE INTRAVENOUSLY OVER A 1 TO 2
HOUR PERIOD TWICE DAILY. THE MAXIMUM DOSE SHOULD NOT EXCEED 50 MG/KG/DAY. THE
DRUG SHOULD BE GIVEN IN 5-DAY COURSES WITH A REST PERIOD OF AT LEAST 2 DAYS
BETWEEN COURSES. AFTER THE FIRST COURSE, SUBSEQUENT COURSES SHOULD NOT EXCEED
50 MG/KG/DAY. DAILY URINALYSES SHOULD NOT BE DONE DURING THE TREATMENT PERIOD.
THE DOSAGE SHOULD BE REDUCED IF ANY UNUSUAL URINARY FINDINGS APPEAR.
INTRAVENOUS ADMINISTRATION IS CONTRAINDICATED IN THE PRESENCE OF ELEVATED
CEREBROSPINAL FLUID PRESSURE. PENICILLAMINE IS ALSO EFFECTIVE IN COPPER
POISONING. GIVE UP TO 100 MG/KG/DAY (MAXIMUM 1 G/DAY) DIVIDED INTO 4 DOSES
FOR NO LONGER THAN 1 WEEK. IF A LONGER ADMINISTRATION PERIOD IS WARRANTED,
DOSAGE SHOULD NOT EXCEED 40 MG/KG/DAY. GIVE THE DRUG ORALLY, HALF AN HOUR
BEFORE MEALS (DREIBACH, HANDBOOK OF POISONING, 11TH ED.), ANTIDOTE SHOULD
BE ADMINISTERED BY QUALIFIED MEDICAL PERSONNEL.

REACTIVITY

REACTIVITY:
STABLE UNDER NORMAL TEMPERATURES AND PRESSURES.

INCOMPATIBILITIES:
CUPRIC CHLORIDE:
POTASSIUM: POSSIBLE EXPLOSION ON IMPACT.
SODIUM: POSSIBLE EXPLOSION ON IMPACT.

DECOMPOSITION:
THERMAL DECOMPOSITION PRODUCTS MAY INCLUDE TOXIC AND CORROSIVE FUMES OF
CHLORIDES.

POLYMERIZATION:
HAZARDOUS POLYMERIZATION HAS NOT BEEN REPORTED TO OCCUR UNDER NORMAL
TEMPERATURES AND PRESSURES.

STORAGE AND DISPOSAL

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING
OF THIS SUBSTANCE. FOR ASSISTANCE, CONTACT THE DISTRICT DIRECTOR OF THE
ENVIRONMENTAL PROTECTION AGENCY.

*****STORAGE*****

STORE AWAY FROM INCOMPATIBLE SUBSTANCES.

CONDITIONS TO AVOID

MAY BURN BUT DOES NOT IGNITE READILY. FLAMMABLE, POISONOUS GASES MAY
ACCUMULATE IN TANKS AND HOPPER CARS. MAY IGNITE COMBUSTIBLES (WOOD, PAPER,
OIL, ETC.).

PREVENT DISPERSION OF DUST IN AIR.

SPILL AND LEAK PROCEDURES

SOIL SPILL:
DIG HOLDING AREA SUCH AS LAGOON, POND OR PIT FOR CONTAINMENT.

USE PROTECTIVE COVER SUCH AS A PLASTIC SHEET TO PREVENT MATERIAL FROM
DISSOLVING IN FIRE EXTINGUISHING WATER OR RAIN.

WATER SPILL:
USE MECHANICAL DREDGES OR LIFTS TO EXTRACT IMMOBILIZED MASSES OF POLLUTION AND
PRECIPITATES.

ADD SUITABLE AGENT TO NEUTRALIZE SPILLED MATERIAL TO PH-7.

OCCUPATIONAL SPILL:
DO NOT TOUCH SPILLED MATERIAL. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. FOR
SMALL SPILLS, TAKE UP WITH SAND OR OTHER ABSORBENT MATERIAL AND PLACE INTO
CONTAINERS FOR LATER DISPOSAL. FOR SMALL DRY SPILLS, WITH CLEAN SHOVEL PLACE
MATERIAL INTO CLEAN, DRY CONTAINER AND COVER. MOVE CONTAINERS FROM SPILL
AREA. FOR LARGER SPILLS, DIKE FAR AHEAD OF SPILL FOR LATER DISPOSAL. KEEP
UNNECESSARY PEOPLE AWAY. ISOLATE HAZARD AREA AND DENY ENTRY.

REPORTABLE QUANTITY (RQ): 10 POUNDS
THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) SECTION 304 REQUIRES
THAT A RELEASE EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY FOR THIS
SUBSTANCE BE IMMEDIATELY REPORTED TO THE LOCAL EMERGENCY PLANNING COMMITTEE
AND THE STATE EMERGENCY RESPONSE COMMISSION (40 CFR 355.40). IF THE RELEASE OF
THIS SUBSTANCE IS REPORTABLE UNDER CERCLA SECTION 103, THE NATIONAL RESPONSE
CENTER MUST BE NOTIFIED IMMEDIATELY AT (800) 424-8802 OR (202) 426-2675 IN THE
METROPOLITAN WASHINGTON, D.C. AREA (40 CFR 302.6).

PROTECTIVE EQUIPMENT

VENTILATION:
PROVIDE LOCAL EXHAUST OR PROCESS ENCLOSURE VENTILATION TO MEET PUBLISHED
EXPOSURE LIMITS.

RESPIRATOR:

THE FOLLOWING RESPIRATORS AND MAXIMUM USE CONCENTRATIONS ARE RECOMMENDATIONS BY THE U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, NIOSH POCKET GUIDE TO CHEMICAL HAZARDS OR NIOSH CRITERIA DOCUMENTS, OR DEPARTMENT OF LABOR, 29CFR1910 SUBPART Z. THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTAMINATION LEVELS FOUND IN THE WORK PLACE AND BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE OF OCCUPATIONAL SAFETY AND HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION.

COPPER DUST AND MIST (AS CU):

- 5 MG/M3- ANY DUST AND MIST RESPIRATOR EXCEPT SINGLE-USE RESPIRATORS.
- 10 MG/M3- ANY DUST AND MIST RESPIRATOR EXCEPT SINGLE-USE AND QUARTER-MASK RESPIRATORS.
ANY SUPPLIED-AIR RESPIRATOR.
ANY SELF-CONTAINED BREATHING APPARATUS.
- 25 MG/M3- ANY POWERED AIR-PURIFYING RESPIRATOR WITH A DUST AND MIST FILTER.
ANY SUPPLIED-AIR RESPIRATOR OPERATED IN A CONTINUOUS FLOW MODE.
- 50 MG/M3- ANY AIR-PURIFYING FULL FACEPIECE RESPIRATOR WITH A HIGH-EFFICIENCY PARTICULATE FILTER.
ANY SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE.
ANY SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE.
ANY POWERED AIR-PURIFYING RESPIRATOR WITH A TIGHT-FITTING FACEPIECE AND A HIGH-EFFICIENCY PARTICULATE FILTER.
- 1000 MG/M3- ANY SUPPLIED-AIR RESPIRATOR WITH A HALF-MASK AND OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.
- 2000 MG/M3- ANY SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE AND OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.
- ESCAPE- ANY AIR-PURIFYING FULL FACEPIECE RESPIRATOR WITH A HIGH-EFFICIENCY PARTICULATE FILTER.
ANY APPROPRIATE ESCAPE-TYPE SELF-CONTAINED BREATHING APPARATUS.

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:

SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN PRESSURE DEMAND OR OTHER POSITIVE PRESSURE MODE.

SUPPLIED-AIR RESPIRATOR WITH FULL FACEPIECE AND OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

CLOTHING:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE (IMPERVIOUS) CLOTHING AND EQUIPMENT TO PREVENT REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:

EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES TO PREVENT EYE CONTACT WITH THIS SUBSTANCE. CONTACT LENSES SHOULD NOT BE WORN.

AUTHOR: ~~XXXXXXXXXX~~ FISHER SCIENTIFIC GROUP, INC.
CREATION DATE: 10/03/84 REVISION DATE: 12/23/85

-ADDITIONAL INFORMATION-

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****CUPRIC CHLORIDE, DIHYDRATE****
****CUPRIC CHLORIDE, DIHYDRATE****
****CUPRIC CHLORIDE, DIHYDRATE****

MATERIAL SAFETY DATA SHEET

FISHER SCIENTIFIC
CHEMICAL DIVISION
1 REAGENT LANE
FAIR LAWN NJ 07410
(201) 796-7100

EMERGENCY NUMBER: (201) 796-7100
CHEMTREC ASSISTANCE: (800) 424 9300

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SUBSTANCE IDENTIFICATION

CAS NUMBER 10125-13-0
SUBSTANCE ****CUPRIC CHLORIDE, DIHYDRATE****

TRADE NAMES/SYNONYMS:

COPPER CHLORIDE DIHYDRATE, COPPER DICHLORIDE DIHYDRATE,
COPPER CHLORIDE (CUCL2), DIHYDRATE, CUPRIC CHLORIDE DIHYDRATE,
COPPER CHLORIDE (CUCL2 2H2O), STCC 4944173, UN2802; C-454; C-455, CL2CUH4O2;
AC05625

CHEMICAL FAMILY:
INORGANIC SALT

MOLECULAR FORMULA: CU-CL2.2H2O

MOLECULAR WEIGHT: 170.43

CERCLA RATINGS (SCALE 0-3): HEALTH-3 FIRE-0 REACTIVITY-0 PERSISTENCE-3
NFPA RATINGS (SCALE 0-4): HEALTH-U FIRE-0 REACTIVITY-0

COMPONENTS AND CONTAMINANTS

COMPONENT: CUPRIC CHLORIDE, DIHYDRATE PERCENT: 100.0
CAS# 10125-13-0

OTHER CONTAMINANTS: NONE

EXPOSURE LIMITS

COPPER DUST AND MIST (AS CU):

- 1 MG/M3 OSHA TWA
- 1 MG/M3 ACGIH TWA
- 1 MG/M3 NIOSH RECOMMENDED TWA
- 1 MG/M3 DFG MAK TWA (TOTAL DUST)
- 2 MG/M3 DFG MAK 30 MINUTE PEAK, AVERAGE VALUE, 4 TIMES/SHIFT

MEASUREMENT METHOD: PARTICULATE FILTER; ACID; ATOMIC ABSORPTION
SPECTROMETRY; (NIOSH VOL. III # 7029).

SUBJECT TO SARA SECTION 313 ANNUAL TOXIC CHEMICAL RELEASE REPORTING

PHYSICAL DATA

DESCRIPTION: GREEN TO BLUE DELIQUESCENT CRYSTALS OR POWDER.

BOILING POINT: 1819 F (993 C) (DECOMPOSES) MELTING POINT: 212 F (100 C)

SPECIFIC GRAVITY: 2.54 PH: 3.6 @ 0.2 M SOLUTION

SOLUBILITY IN WATER: 110% @ 0 C

SOLVENT SOLUBILITY: SOLUBLE IN METHANOL, ETHANOL, AND AMMONIUM HYDROXIDE;
MODERATELY SOLUBLE IN ACETONE AND ETHYL ACETATE; SLIGHTLY SOLUBLE IN ETHER.

LOSES WATER OF HYDRATION BETWEEN 158-392 F (70-200 C).

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
NEGLECTIBLE FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.

FIREFIGHTING MEDIA:

DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR REGULAR FOAM
(1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).

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FOR LARGER FIRES, USE WATER SPRAY, FOG OR REGULAR FOAM
(1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).

FIREFIGHTING:

MOVE CONTAINER FROM FIRE AREA IF YOU CAN DO IT WITHOUT RISK. APPLY COOLING
WATER TO SIDES OF CONTAINERS THAT ARE EXPOSED TO FLAMES UNTIL WELL AFTER FIRE
IS OUT. STAY AWAY FROM ENDS OF TANKS (1990 EMERGENCY RESPONSE GUIDEBOOK,
DOT P 5800.5, GUIDE PAGE 60).

USE AGENTS SUITABLE FOR TYPE OF FIRE. AVOID BREATHING CORROSIVE VAPORS. KEEP
UPWIND.

TRANSPORTATION DATA

DEPARTMENT OF TRANSPORTATION HAZARD CLASSIFICATION 49-CFR 172.101:
ORM-B

DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS 49-CFR 172.101 AND
SUBPART E:
NONE

DEPARTMENT OF TRANSPORTATION PACKAGING REQUIREMENTS: 49-CFR 173.800
EXCEPTIONS: 49-CFR 173.505

TOXICITY

CUPRIC CHLORIDE:

TOXICITY DATA:

ANHYDROUS: 17,500 UG/KG INTRAVENOUS-MOUSE LD50; 7400 UG/KG
INTRAPERITONEAL-MOUSE LD50; MUTAGENIC DATA (RTECS).

DIHYDRATE: NO DATA AVAILABLE.

CARCINOGEN STATUS: NONE.

LOCAL EFFECTS: IRRITANT- EYE, SKIN, AND MUCOUS MEMBRANES.

ACUTE TOXICITY LEVEL: INSUFFICIENT DATA.

TARGET EFFECTS: POISONING MAY AFFECT THE LIVER, KIDNEYS AND SPLEEN.

AT INCREASED RISK FROM EXPOSURE: PERSONS WITH PRE-EXISTING

RESPIRATORY, LIVER, SKIN, KIDNEY, HEMATOPOIETIC OR WILSON'S DISEASE.*

* BASED ON INFORMATION ON COPPER SALTS.

HEALTH EFFECTS AND FIRST AID

INHALATION:

CUPRIC CHLORIDE:

IRRITANT

MAY CAUSE IRRITATION OF MUCOUS MEMBRANES, SORE THROAT, COUGHING, AND
SHORTNESS OF BREATH. INHALATION OF COPPER DUST MAY CAUSE AN ILLNESS SIMILAR
TO THE COMMON COLD WITH SENSATIONS OF CHILLS AND STIFFNESS OF THE HEAD.
PROLONGED INHALATION OF DUST OR MIST OF COPPER SALTS MAY CAUSE CONGESTION
OF THE NASAL MUCOUS MEMBRANES, SOMETIMES OF THE PHARYNX, AND ON OCCASIONS
ULCERATION AND PERFORATION OF THE NASAL SEPTUM. ATROPHIC CHANGES IN THE
MUCOUS MEMBRANES WERE NOTED IN SUBJECTS EXPOSED TO COMPLEX COPPER SALTS FOR
LONG PERIODS OF TIME. INHALATION OF COPPER COMPOUNDS HAS CAUSED INJURY TO
THE LUNGS AND LIVER WITH HEMOCHROMATOSIS IN ANIMALS. SEE INFORMATION ON
METAL FUME FEVER.
REPRODUCTIVE EFFECTS HAVE BEEN REPORTED IN ANIMALS.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING
HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP PERSON WARM AND AT REST.
TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:

CUPRIC CHLORIDE:

IRRITANT

ACUTE EXPOSURE- DIRECT CONTACT MAY CAUSE REDNESS, PAIN, AND IRRITATION.
COPPER SALTS HAVE BEEN REPORTED TO CAUSE AN ITCHING PAPULOVESICULATION,
SKIN DISCOLORATION AND ECZEMATOID LESIONS.
CHRONIC EXPOSURE- REPEATED OR PROLONGED CONTACT WITH SOME COPPER SALTS HAS
RESULTED IN IRRITATION, NECROSIS, AND GREENISH SKIN DISCOLORATION.
ALLERGIC CONTACT DERMATITIS, ALTHOUGH RARE, HAS BEEN REPORTED.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED
AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO
EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL
ATTENTION IMMEDIATELY.

EYE CONTACT:

CUPRIC CHLORIDE:

IRRITANT

ACUTE EXPOSURE- DIRECT CONTACT MAY CAUSE REDNESS, PAIN, AND BLURRED VISION.
APPLICATION OF A 0.08 TO 0.16 M SOLUTION OF CUPRIC CHLORIDE TO THE
CORNEAS OF RABBITS AFTER THE REMOVAL OF THE EPITHELIUM CAUSED A
SEVERE REACTION WITH PERMANENT OPACIFICATION. SOME COPPER SALTS
HAVE BEEN REPORTED TO CAUSE CONJUNCTIVITIS, CORNEAL ULCERATION, AND
TURBIDITY POSSIBLY WITH PALPEBRAL EDEMA. COPPER PARTICLES EMBEDDED IN
THE EYE MAY RESULT IN A PRONOUNCED FOREIGN-BODY RESPONSE WITH
CHARACTERISTIC DISCOLORATION OF OCULAR TISSUE.

0908-2191

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CHRONIC EXPOSURE- REPEATED AND PROLONGED CONTACT WITH IRRITANTS MAY CAUSE CONJUNCTIVITIS.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER OR NORMAL SALINE. OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:

CUPRIC CHLORIDE:

ACUTE EXPOSURE- INGESTION MAY CAUSE ABDOMINAL PAIN, VOMITING AND DIARRHEA. INGESTION OF COPPER SALTS MAY CAUSE AN IMMEDIATE METALLIC TASTE. SALIVATION, NAUSEA, EPIGASTRIC BURNING, ULCERS, HEMORRHAGIC GASTRITIS, ANURIA, COMA, CONVULSIONS AND DEATH.
CHRONIC EXPOSURE- REPEATED AND PROLONGED INGESTION OF COPPER SALTS HAS PRODUCED HEMOLYTIC ANEMIA AND LIVER, KIDNEY, AND SPLEEN DAMAGE IN ANIMALS.

FIRST AID- DILUTE THE POISON IMMEDIATELY WITH LARGE AMOUNTS OF WATER OR MILK AND REMOVE BY GASTRIC LAVAGE UNLESS THE VICTIM IS ALREADY VOMITING. (DREISBACH, HANDBOOK OF POISONING, 12TH ED.) GET MEDICAL ATTENTION IMMEDIATELY. ADMINISTRATION OF GASTRIC LAVAGE SHOULD BE PERFORMED BY QUALIFIED MEDICAL PERSONNEL.

ANTIDOTE:

THE FOLLOWING ANTIDOTE HAS BEEN RECOMMENDED. HOWEVER, THE DECISION AS TO WHETHER THE SEVERITY OF POISONING REQUIRES ADMINISTRATION OF ANY ANTIDOTE AND ACTUAL DOSE REQUIRED SHOULD BE MADE BY QUALIFIED MEDICAL PERSONNEL.

COPPER POISONING:

GIVE CALCIUM DISODIUM EDETATE 15-25 MG/KG (0.08-0.125 ML OF 20% SOLUTION PER KILOGRAM BODY WEIGHT) IN 250-500 ML OF 5% DEXTROSE INTRAVENOUSLY OVER A 1 TO 2 HOUR PERIOD TWICE DAILY. THE MAXIMUM DOSE SHOULD NOT EXCEED 50 MG/KG/DAY. THE DRUG SHOULD BE GIVEN IN 5-DAY COURSES WITH A REST PERIOD OF AT LEAST 2 DAYS BETWEEN COURSES. AFTER THE FIRST COURSE, SUBSEQUENT COURSES SHOULD NOT EXCEED 50 MG/KG/DAY. DAILY URINALYSES SHOULD NOT BE DONE DURING THE TREATMENT PERIOD. THE DOSAGE SHOULD BE REDUCED IF ANY UNUSUAL URINARY FINDINGS APPEAR. INTRAVENOUS ADMINISTRATION IS CONTRAINDICATED IN THE PRESENCE OF ELEVATED CEREBROSPINAL FLUID PRESSURE. PENICILLAMINE IS ALSO EFFECTIVE IN COPPER POISONING. GIVE UP TO 100 MG/KG/DAY (MAXIMUM 1 G/DAY) DIVIDED INTO 4 DOSES FOR NO LONGER THAN 1 WEEK. IF A LONGER ADMINISTRATION PERIOD IS WARRANTED, DOSAGE SHOULD NOT EXCEED 40 MG/KG/DAY. GIVE THE DRUG ORALLY, HALF AN HOUR BEFORE MEALS (DREISBACH, HANDBOOK OF POISONING, 12TH ED.). ANTIDOTE SHOULD BE ADMINISTERED BY QUALIFIED MEDICAL PERSONNEL.

REACTIVITY

REACTIVITY:
STABLE UNDER NORMAL TEMPERATURES AND PRESSURES.

INCOMPATIBILITIES:

CUPRIC CHLORIDE:

POTASSIUM: POSSIBLE EXPLOSION ON IMPACT.
SODIUM: POSSIBLE EXPLOSION ON IMPACT.

DECOMPOSITION:

THERMAL DECOMPOSITION PRODUCTS MAY INCLUDE TOXIC AND HAZARDOUS FUMES OF HYDROGEN CHLORIDE AND OXIDES OF COPPER.

POLYMERIZATION:

HAZARDOUS POLYMERIZATION HAS NOT BEEN REPORTED TO OCCUR UNDER NORMAL TEMPERATURES AND PRESSURES.

STORAGE AND DISPOSAL

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE.

STORAGE

STORE AWAY FROM INCOMPATIBLE SUBSTANCES.

CONDITIONS TO AVOID

MAY BURN BUT DOES NOT IGNITE READILY. FLAMMABLE. POISONOUS GASES MAY ACCUMULATE IN TANKS AND HOPPER CARS. MAY IGNITE COMBUSTIBLES (WOOD, PAPER, OIL, ETC.).

PREVENT DISPERSION OF DUST.

SPILL AND LEAK PROCEDURES

SOIL SPILL:

DIG HOLDING AREA SUCH AS LAGOON, POND OR PIT FOR CONTAINMENT.

USE PROTECTIVE COVER SUCH AS A PLASTIC SHEET TO PREVENT MATERIAL FROM DISSOLVING IN FIRE EXTINGUISHING WATER OR RAIN.

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WATER SPILL:
USE MECHANICAL DREDGES OR LIFTS TO EXTRACT IMMOBILIZED MASSES OF POLLUTION AND PRECIPITATES.

ADD SUITABLE AGENT TO NEUTRALIZE SPILLED MATERIAL TO PH 7

OCCUPATIONAL SPILL:

DO NOT TOUCH SPILLED MATERIAL STOP LEAK IF YOU CAN DO IT WITHOUT RISK. FOR SMALL SPILLS, TAKE UP WITH SAND OR OTHER ABSORBENT MATERIAL AND PLACE INTO CONTAINERS FOR LATER DISPOSAL. FOR SMALL DRY SPILLS, WITH CLEAN SHOVEL PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER. MOVE CONTAINERS FROM SPILL AREA. FOR LARGER SPILLS, DIKE FAR AHEAD OF SPILL FOR LATER DISPOSAL. KEEP UNNECESSARY PEOPLE AWAY. ISOLATE HAZARD AREA AND DENY ENTRY.

PROTECTIVE EQUIPMENT

VENTILATION:

PROVIDE LOCAL EXHAUST VENTILATION SYSTEM TO MEET PUBLISHED EXPOSURE LIMITS.

RESPIRATOR:

THE FOLLOWING RESPIRATORS AND MAXIMUM USE CONCENTRATIONS ARE RECOMMENDATIONS BY THE U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, NIOSH POCKET GUIDE TO CHEMICAL HAZARDS, NIOSH CRITERIA DOCUMENTS OR BY THE U.S. DEPARTMENT OF LABOR, 29 CFR 1910 SUBPART Z. THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTAMINATION LEVELS FOUND IN THE WORK PLACE. MUST NOT EXCEED THE WORKING LIMITS OF THE RESPIRATOR AND BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION (NIOSH-MSHA).

COPPER DUST AND MIST (AS CU):

5 MG/M3- ANY DUST AND MIST RESPIRATOR.

10 MG/M3- ANY DUST AND MIST RESPIRATOR EXCEPT SINGLE USE AND QUARTER MASK RESPIRATORS.
ANY SUPPLIED-AIR RESPIRATOR.
ANY SELF-CONTAINED BREATHING APPARATUS.

25 MG/M3- ANY POWERED, AIR-PURIFYING RESPIRATOR WITH A DUST AND MIST FILTER ANY SUPPLIED-AIR RESPIRATOR OPERATED IN A CONTINUOUS FLOW MODE

50 MG/M3- ANY AIR-PURIFYING, FULL-FACEPIECE RESPIRATOR WITH A HIGH-EFFICIENCY PARTICULATE FILTER.
ANY SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE
ANY SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE
ANY POWERED, AIR-PURIFYING RESPIRATOR WITH A TIGHT FITTING FACEPIECE AND A HIGH-EFFICIENCY PARTICULATE FILTER

2000 MG/M3- ANY SUPPLIED-AIR RESPIRATOR THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE

ESCAPE- ANY AIR-PURIFYING, FULL-FACEPIECE RESPIRATOR WITH A HIGH EFFICIENCY PARTICULATE FILTER
ANY APPROPRIATE ESCAPE-TYPE, SELF-CONTAINED BREATHING APPARATUS

* IF NOT PRESENT AS A FUME.

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS

ANY SELF-CONTAINED BREATHING APPARATUS THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE

ANY SUPPLIED-AIR RESPIRATOR THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

CLOTHING:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE (IMPERVIOUS) CLOTHING AND EQUIPMENT TO PREVENT REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:

EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST RESISTANT SAFETY GOGGLES TO PREVENT EYE CONTACT WITH THIS SUBSTANCE

EMERGENCY EYE WASH: WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHOULD PROVIDE AN EYE WASH FOUNTAIN WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

AUTHORIZED: FISHER SCIENTIFIC, INC.
CREATION DATE: 06/08/92 REVISION DATE: 03/24/93

ADDITIONAL INFORMATION:

0908-2192

TRW-00826

DATE: 08/27/93

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0908-2193

TRW-00827

FISHER SCIENTIFIC

MSDS

**IMPORTANT SAFETY INFORMATION -- DO NOT DISCARD.
PLEASE ROUTE TO COMPANY SAFETY OFFICER.**

AMERICAN ENGINEERED
COMPONENTS
120 ROGERS STREET

CAMBRIDGE MA 02142

**IF NAME AND/OR ADDRESS HAVE CHANGED, CONTACT YOUR FISHER
SALES REPRESENTATIVE OR LOCAL FISHER BRANCH.**

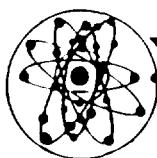
FOR EACH CHEMICAL, A MSDS SHEET WILL BE SENT ONLY ON THE
FIRST SHIPMENT UNLESS A SUBSTANTIAL REVISION OCCURS.

REQUIRED MATERIAL SAFETY DATA SHEETS (MSDS) NOT INCLUDED IN
THIS MAILING WILL FOLLOW UNDER SEPARATE COVER.

THIS PACKET MAY CONTAIN MSDS FOR PRODUCTS MANUFACTURED BY
OTHERS AND DISTRIBUTED BY FISHER SCIENTIFIC COMPANY. THESE
MSDS WERE PREPARED BY THE MANUFACTURER AND FISHER DISCLAIMS
ALL LIABILITY FOR THE CONTENT.

**FISHER SCIENTIFIC HAS A COMPLETE LINE OF SAFETY PRODUCTS AND INFORMATION FOR THE LABORATORY.
CONTACT YOUR LOCAL FISHER BRANCH FOR FILMS, BROCHURES, CATALOGS AND PRODUCTS.**

TRW-00828



HUSSEY COPPER LTD.

BY: HUSSEY COPPER CORP., GENERAL PARTNER
LEETSDALE, PA 15056

M.S.D.S. HC-85-70

DATE: 3/26/85

REV. DATE: 4/21/86

REVISION NO.: 2

MATERIAL SAFETY DATA SHEET

SECTION I

MANUFACTURER'S NAME: HUSSEY COPPER LTD.
ADDRESS: Washington Street LEETSDALE, PA. 15056
EMERGENCY PHONE NO.: 412-857-4200
CHEMICAL NAME AND SYNONYMS: COPPER ;NICKEL
TRADE NAME AND SYNONYMS: Cupro Nickel, 90/10, 70/30, CDA Alloy 706, 715
CHEMICAL FAMILY: COPPER AND NICKEL

SECTION II - HAZARDOUS INGREDIENTS

INGREDIENT	PERCENT		CAS NO.	OSHA-PEL/ACGIH-TLV
	706	715		
Copper	86.5 min	65.0 min	7440-50-8	Exposure Levels See Section V
Nickel	9.0-11.0	29.0-32.0	7440-02-0	
Iron	1.0-1.75	1.0 max	(IRON) 1309-37-1	
Manganese	.75 max	.25-1.0	(OXIDE) 7439-96-5	

HAZARDOUS MIXTURES OF OTHERS LIQUIDS, SOLIDS, OR GASES:

If exposure to copper and nickel dust/fume is kept below Permissible Exposure Limits (PEL)/Threshold Limit Value (TLV) iron and Manganese along with other trace impurities should not pose any health risk.

SECTION III - PHYSICAL DATA

MELTING	Alloy 706/ 2010° F	Alloy 715/ 2140° F
Vapor Pressure (mm Hg.)	Not Applicable	Not Applicable
Solubility in Water	negligible	negligible
Specific Gravity (H² O = 1)	8.94	8.94

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used)	Not applicable *
Extinguishing Media	Not Applicable
Special Fire Fighting Procedures	Not applicable
Unusual Fire and Explosion Hazards	Not applicable

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* Under normal conditions. Heavy concentrations of fine copper dust may cause flash fire if exposed to ignition source.

SECTION V - HEALTH HAZARD DATA

EXPOSURE LEVELS: Copper dusts and mists - OSHA (PEL): TWA = 1MG/M³. ACGIH (TLV): TWA = 1 MG/M³.
Copper fume - OSHA (PEL): TWA = 0.1 MG/M³. ACGIH (TLV): TWA = 0.2 MG/M³.
Nickel - OSHA (PEL): TWA = 1 MG/M³. ACGIH (TLV): TWA = 1 MG/M³. Iron
Oxide fume (Fe₂O₃) - OSHA (PEL): TWA = 10 MG/M³. ACGIH (TLV): TWA = 5 MG/M³.
Manganese - OSHA (PEL): Ceiling = 5 MG/M³.

CARCINOGENICITY: Nickel is listed by NTP as an anticipated human carcinogen and by IARC as a probable human carcinogen. Other ingredients not listed.

EFFECT OF OVERDOSE: Gingivitis, stomatitis, metallic taste, sneezing, congestion, nausea, chills, fever.

EMERGENCY AND FIRST AID PROCEDURES:
Skin: Flush thoroughly with water. Eyes: Flush with water, call Physician.
Ingestion - call Physician. Inhalation: Remove victim to fresh air, call Physician.
Nickel and copper fume, dusts and mists are listed by OSHA as air contaminants.

PRIMARY ROUTE(S) OF ENTRY: Inhalation

SECTION VI - REACTIVITY DATA

STABILITY - Stable

INCOMPATIBILITY (material to avoid): (Dust & Fume) acetylene, chlorine

HAZARDOUS DECOMPOSITION PRODUCTS: Copper Fume/dust. Nickel Fume/dust. Iron Oxide fume.
Manganese Fume/dust.

HAZARDOUS POLYMERIZATION - Will Not Occur

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:

Dust or Fume - wear respirator follow OSHA use instructions, shovel up, or vacuum and place in approved DOT container and seal. Wash contaminated clothing.

WASTE DISPOSAL METHOD:

Dispose of contaminated product and materials used in cleaning up spills or leaks in a manner approved for this material. Follow federal, state and local regulations for disposal.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify Type): dust or fume - NIOSH/MSHA approved dust/fume respirator

VENTILATION - Local Exhaust: dust/fume - if exposure levels exceeded.

EYE PROTECTION: (dust) goggles

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Avoid breathing dust or fumes. Do not take internally.

Preclude from exposure to fume and dust those individuals with diseases of the skin, sinuses and lungs.

TRW-00830



OCEAN® Network
EMERGENCY PHONE 1-800-OLIN-911

MATERIAL SAFETY DATA

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS Cupro Nickel 10%		
CHEMICAL FAMILY Copper	FORMULA Mixture	TRADE NAME Alloy 706
DESCRIPTION Metal		CAS NO. Not assigned/mixture

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Precautions needed for abrasive, melting or other operations generating a dust or fume. Do not get dust or fume in eyes, on skin or on clothing. Do not take internally. Wash thoroughly with soap and water before eating or smoking. Avoid breathing dust or fumes.		
PROTECTIVE EQUIPMENT		VENTILATION REQUIREMENTS
Eyes	Dust - goggles	As required to keep airborne concentrations below TLV for copper and nickel.
Gloves	Impervious	
Other	NIOSH/MSHA approved high efficiency particulate respirator if excessive dusting/fumes occur	

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL		OSHA PEL	LD 50	LC 50	SIGNIFICANT EFFECTS
Copper	Dust	1 mg/m ³	TD _{LO}	No data	Metal fume fever, respiratory irritation
	Fume	0.1 mg/m ³	120 ug/kg (human)		
Nickel	Dust	1 mg/m ³	LD _{LO}	No data	Dermatitis, suspect carcinogen
			5 mg/kg (guinea pig)		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD Not Applicable	OSHA CLASSIFICATION Non-combustible solid	FLAMMABLE EXPLOSIVE LIMITS	LOWER N/A	UPPER N/A
EXTINGUISHING MEDIA Non-combustible - Choose extinguishing media suitable for surrounding materials.				
SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved self-contained breathing apparatus where this material is involved in a fire.				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE	None established for mixture (Copper fume 0.2 mg/m ³ , Nickel dust 1.0 mg/m ³ ACGIH 1985-86).			
SYMPTOMS OF OVER EXPOSURE	Dust and fume - sneezing, congestion, metallic taste, nausea, chills, dermatitis			
SKIN	Dust or fume: Wash with soap and water before eating or smoking. If an irritation develops, call a physician.			
EYES	Dust or fume: Flush with water for 15 minutes. Call a physician.			
INGESTION	Dust: Not a likely route of exposure. If ingested, call a physician.			
INHALATION	Dust or Fume: Remove victim to fresh air. Call a physician.			

TRW-00831

0908-2197

Chemical Alloy 706

CAS No.

Health	2
Flammability	1
Reactivity	0
Personal Protection	A

HMIS Ratings

BOWMAN DISTRIBUTION MATERIAL SAFETY DATA SHEET

Health	2
Flammability	1
Reactivity	0
Specific Hazard	

NFPA Ratings

SECTION I

PRODUCT NAME CUTTING TOOL COOLANT		BOWMAN PART NO. 19466 (page 1 of 2)
SUPPLIER Bowman Distribution, Barnes Group Inc.		EMERGENCY TELEPHONE NO. (216) 391-7200
ADDRESS 850 East 72nd Street, Cleveland, OH 44103		DATE 1/22/90
HAZARDOUS MATERIAL DESCRIPTION, PROPER SHIPPING NAME, HAZARD CLASS, HAZARD ID NO. (49 CFR 172.101) Consumer Commodity, ORM-D UN-1956		
ADDITIONAL HAZARD CLASSES (as applicable) N.A.		
CHEMICAL FAMILY Mixture	FORMULA TM-842A	

SECTION II - HAZARDOUS INGREDIENTS

CAS REGISTRY NUMBER	%W	%V	CHEMICAL NAME(S)	PPM OSHA PEL	PPM ACGIH TLV	STEL Other Limits	Listed as Carcinogen NTP, IARC or OSHA 1910(z) (specify)
71-55-6	73		*1,1,1 Trichloroethane	350	350	450	No
127-18-4	24		*Perchloroethylene	25	50	200	Yes (IARC)
124-38-9	3		Carbon Dioxide	5000	5000	30000	No

ALL CHEMICAL COMPOUNDS MARKED WITH AN ASTERISK () ARE TOXIC CHEMICALS SUBJECT TO THE REPORTING REQUIREMENTS OF SECTION 313 OF TITLE III OF THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) OF 1986 AND 40 CFR PART 372.

SECTION III - PHYSICAL DATA

BOILING POINT 162-252 °F _____ °C	SPECIFIC GRAVITY (H ₂ O = 1) 1.5		
VAPOR PRESSURE @ 70 °F _____ °C <input type="checkbox"/> mm Hg <input checked="" type="checkbox"/> X psi	PERCENT VOLATILE BY VOLUME (%) 100	PERCENT SOLID BY WEIGHT (%) N.A.	
VAPOR DENSITY (AIR = 1) Heavier than air	EVAPORATION RATE (BuAc = 1) Butyl Acetate	<5.0	
SOLUBILITY IN WATER None	PH =	N.A.	
APPEARANCE AND ODOR Clear/solvent odor		MATERIAL IS: Liquid & Gas	

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT None _____ °F _____ °C	method used	FLAMMABLE LIMITS	LEL None	UEL None
EXTINGUISHING MEDIA Use water fog, dry chemical or carbon dioxide.				
SPECIAL FIRE FIGHTING PROCEDURES Aerosol cans may rupture when heated.				
UNUSUAL FIRE AND EXPLOSION HAZARDS Heated cans may burst.				

19466 (page 1 of 2)

N.A. - Not Applicable
N.E. - Not Established
N.D. - Not Determined

TRW-00832

0908-2198

SECTION V - HEALTH HAZARD DATA

HEALTH HAZARDS (ACUTE AND CHRONIC - INCLUDE TARGET ORGAN EFFECTS) May cause dizziness or narcosis in high vapor concentrations. Will cause defatting of skin. Effects are reversible. Long term exposure (years) vapor may cause lung, liver or kidney damage. The solvents listed have been reported to affect the central nervous system.	
CONDITIONS TO AVOID Exposure to high concentrations of vapor.	
SIGNS AND SYMPTOMS OF OVEREXPOSURE Inhalation - difficulty in breathing. Skin-redness. Ingestion-vomiting.	
PRIMARY ROUTES OF ENTRY Inhalation <input checked="" type="checkbox"/> Skin Contact <input checked="" type="checkbox"/> Other (specify) Ingestion	
EMERGENCY AND FIRST AID PROCEDURES Give oxygen-do not induce vomiting. Gastric lavage. Wash eyes and skin with water.	
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE Heart disease, respiratory disorders	

SECTION VI - REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	High temperatures
INCOMPATIBILITY (materials to avoid) The above solvents are incompatible with strong oxidizers. Not compatible with active metals.			
HAZARDOUS DECOMPOSITION PRODUCTS: In fire will decompose to halogen acids and phosgene. In fire will decompose to carbon dioxide and water.			
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	None

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Use absorbent sweeping compound to soak up material. Put into container. Dispose as hazardous waste.	
WASTE DISPOSAL METHOD Dispose as hazardous waste in accordance with EPA RCRA.	
CERCLA (Superfund) REPORTABLE QUANTITY (in lbs.) N.E.	
RCRA HAZARDOUS WASTE NO. (40 CFR 261.33) D-001	
VOLATILE ORGANIC COMPOUND (VOC) as packaged, minus water) 100%	<input checked="" type="checkbox"/> Theoretical 10.8 lb/gal <input type="checkbox"/> Analytical _____ lb/gal

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (specify type) Self contained breathing apparatus if TLV limit is exceeded.		
VENTILATION	LOCAL EXHAUST (specify rate) Yes. Provide sufficient ventilation to maintain exposure below TLV.	SPECIAL None
	MECHANICAL (general) (specify rate) None	OTHER None
PROTECTIVE GLOVES (specify type) None required if spraying		EYE PROTECTION (specify type) Wear eye protection
OTHER PROTECTIVE EQUIPMENT Long sleeves and long pants		

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING Keep away from heat, sparks or open flame. Store at temperatures below 120°F.	TRW-00833
OTHER PRECAUTIONS When spraying more than one-half can continuously, or more than one can consecutively, use NIOSH approved respirator.	



MATERIAL SAFETY DATA SHEET

CP CHEMICALS, Inc.

Required under
29 CFR 1910, 1200

DATE PREPARED 9/13/85 **

EMERGENCY HAZARD RATING

N
F
P
A4 - EXTREME
3 - HIGH
2 - MODERATE
1 - SLIGHT
0 - INSIGNIFICANT

HEALTH

FIRE
1
4
1
*
REACTIVITY

SPECIFIC HAZARD

Arbor Street, Sewaren, NJ 07077 • 201-636-4300 • CHEMTREC 800-424-9300 * KEEP AWAY FROM ACIDS.

SECTION I - PRODUCTION INFORMATION: SINGLE SUBSTANCE ☒ MIXTURE ☐ ** Rvsd. 9/86

Chemical Name & CAS No. SODIUM CYANIDE
CAS # [143-33-9]
Trade Name & Synonyms Cyanide of Soda (also sold as "Brik & Granular")

Chemical Family Soluble Cyanides Chemical Formula NaCN

SECTION II - HAZARDOUS INGREDIENTS AND/OR CHARACTERISTICS

SODIUM CYANIDE 98/99%

SECTION III - PHYSICAL DATA

Melting Point (°F)	1040°	Specific Gravity (H ₂ O=1)	1.6
Boiling Point (°F)	2725°	Percent Volatile by Volume (%)	NA
Bulk Density (LBS/Per Cu/Ft.)	50.8	pH 0.1 N aq. sol.	11.0

Solubility in Water Slight

Appearance and Odor White crystalline powder or lumps; (toxic) almond odor.

SECTION IV - REACTIVITY DATA

Stability	Unstable X	Conditions to Avoid
	Stable	Exposure to air, heat, steam.

Incompatibility (Materials to Avoid) Nitrates, Nitrites, peroxides, oxidizers, etc.

Hazardous Decomposition Products
reacts with atmospheric CO₂, other acids, to release poisonous HCN gas.

Hazardous Polymerization	May Occur	X	Conditions to Avoid
	Will Not Occur		HCN gas may polymerize explosively.

SECTION V - FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used)	NA	Flammable Limits	NA	LeL	NA	UeL	NA
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Extinguishing Media Alkaline dry chemical. Do not use CO₂, water.

Special Fire Fighting Procedures Toxic to marine life. Avoid flushing water solution to
sewer or stream. Do not mix with acids or acidic water, CO₂, steam.

U 31 Fire and Explosion Hazards Not combustible itself, but thermal decomposition or
acidification releases poisonous and flammable hydrogen cyanide gas.

DOT EMERGENCY RESPONSE GUIDE NO. 55

TRW-00834

0908-2200

SECTION VI - HEALTH HAZARD DATA

Exposure Limits

TLV: 5 mg/M³ (ACGIH) (skin) TWA: 5 mg/M³ (ACGIH) (Skin) Ceiling: NDA

Effects of Overexposure Poisoning may result from ingestion, absorption through injured skin or inhalation of hydrogen cyanide liberated by action of carbon dioxide or other acids. Strong solutions are corrosive to skin, eyes. Damage to central nervous system. Chronic exposure over long periods may cause fatigue.

Emergency First Aid Procedures Always have fresh cyanide first aid kit at hand. /weakness. Call physician immediately.

Eye Wash with copious amounts of water for at least 15 mins. See physician.

Skin Wash with copious amounts of water, remove contaminated clothing. See doctor.

Inhalation Remove to fresh air, lay down. Start treatment immediately with amyl nitrite inhalant. Call physician. Remove contaminated clothing, keep patient

Ingestion Same instructions for inhalation. warm.

See warning label on container for more complete first aid directions.

OTHER HEALTH INFORMATION:

LISTED: ☐ Carcinogen ☐ Teratogen ☐ Mutagen ☒ Other suspected Carcinogen

SECTION VII - SPECIAL PROTECTION INFORMATION - PRODUCTION AND/OR MAINTENANCE OPERATIONS

Respiratory Protection (Specify Type) Respirator approved for cyanides

Ventilation	Local Exhaust Keep HCN below 10 ppm	Special None
	Mechanical (General) Recommended	Other Fresh Cyanide First Aid Kit. Eli-Lilly Item #M76- NDC# 0002-238-501
Protective Gloves	Neoprene	Eye Protection Goggles, face mask

Other Protective Equipment Rubber boots, apron

SECTION VIII - SPILL OR LEAK PROCEDURES

Steps to be Taken in Case Material is Released or Spilled Wearing respirator, cover spilled solid with e. Sweep up; store tightly closed for disposal. Decontaminate area with hypochlorite solution to oxidize residual cyanide.

Waste Disposal Method React cautiously with sodium hypochlorite solution at pH 8.5-10 to oxidize cyanide safely. Ensure complete reaction before sewerage resulting salt (NaCl) solution.

SECTION IX - SPECIAL PRECAUTIONS

Precautions to be taken in Handling and Storing Avoid contact. Keep container tightly closed. Store away from acids, oxidizers. Keep solutions alkaline. Do not store in aluminum or black iron plate receptacles. Keep away from foods & beverages.

Other Precautions High concentration of HCN produces paralysis, unconsciousness, convulsions, and respiratory arrest. Exposure to 150 ppm for ½ to 1 hr. may endanger life. Death may result from a few minutes exposure to 300 ppm. Average fatal dose: 50-60 mg. Headache, vertigo, nausea & vomiting may occur

SECTION X - TRANSPORTATION DATA: with lesser concentrations.

Proper Shipping Name Sodium Cyanide, solid	RQ 10/4.54	Hazard Class Poison B	ID # (49CFR 172-101) UN1689
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Label Requirement POISON

TRW-00835

Special Information High toxicity after inhalation. Fairly high concentrations (when inhaled approx. 200 ppm, orally 200-300 mg NaCN) cause immediate loss of consciousness and death.

NA = NOT APPLICABLE

NDA = NO DATA AVAILABLE

< = LESS THAN

> = MORE THAN

The information herein is believed to be reliable. However, no warranty, express or implied, is made as to its accuracy or completeness, and none is made as to the fitness of this material for any purpose. The manufacturer shall not be liable for damages to person, or property resulting from its use. Nothing herein shall be construed as a recommendation for use in violation of any patent.

FORM 10-85

0908-2201